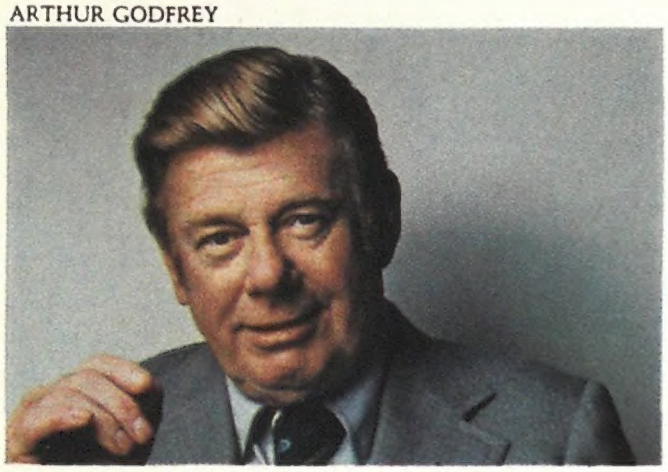
April 1972

Smithsonian

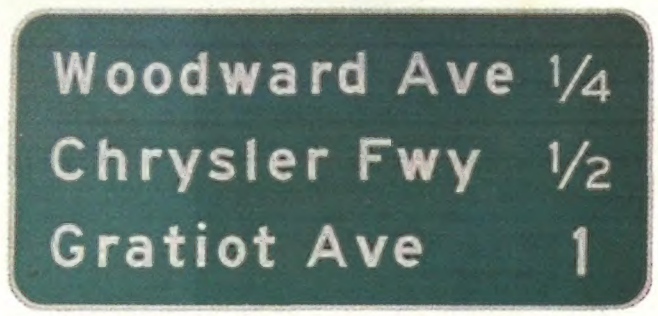
A city's towering symbol started as a structural tour de force by M. Eiffel (p. 48)

It doesn't matter who you are. You can't get a Chrysler Imperial that hasn't had a shakedown in Detroit traffic.

ARTHUR GODFREY



Nobody, but nobody gets an unused Imperial. Every Imperial that Chrysler builds gets somewhere between twelve and fifteen miles put on it before it ever gets delivered. If there are any problems, Chrysler wants to find them before you do.



Each car is checked on city streets and freeways, in all kinds of traffic conditions. The test drivers listen for wind noise and check for rattles. They even inspect *under* the car: Things like the fuel line and brake line. There's a check sheet with more than 200 items that gets filled out on each car. If it's not right, they don't want you to have it.

CHRYSLER
Plymouth

Coming through with the kind of car America wants.

That's their slogan this year, and I think they're living up to it.

I've seen the way they build the 1972 Chryslers. It's obvious, they want these cars to last longer and perform better than any car they've ever built before.

Your Chrysler-Plymouth dealer can let you take an Imperial out for a road test of your own. You'll see what I mean.

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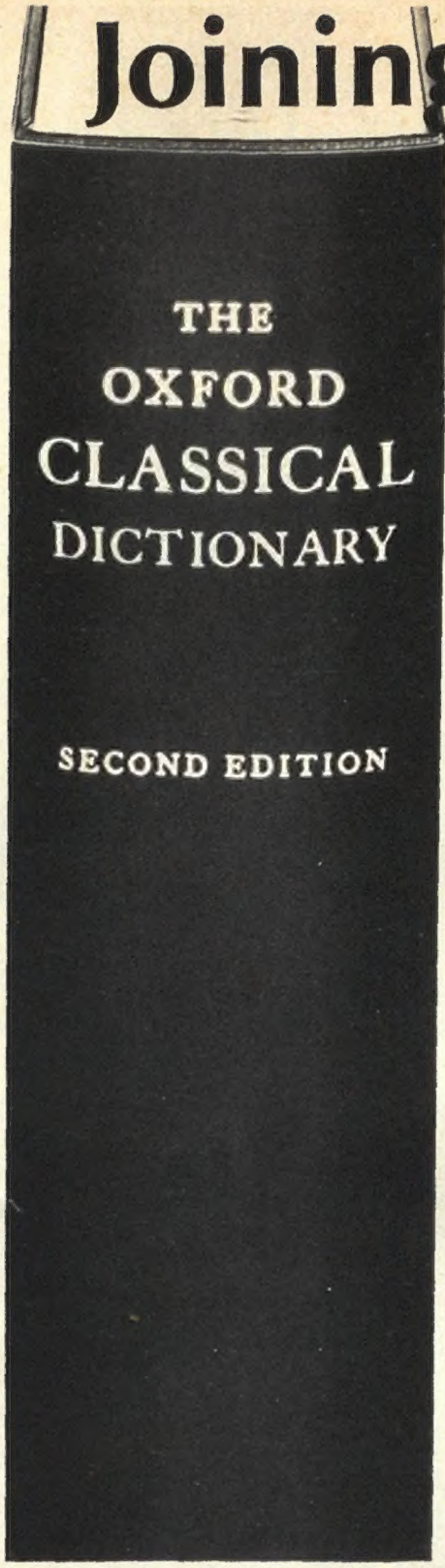

Look who else is coming to dinner:

Bertolt Brecht • Edmund Wilson • Wallace Stevens • Leo Tolstoy • Scott Fitzgerald • Thomas Mann • and that promising youngster whose first full-length novel has just been published, Fyodor Dostoevsky

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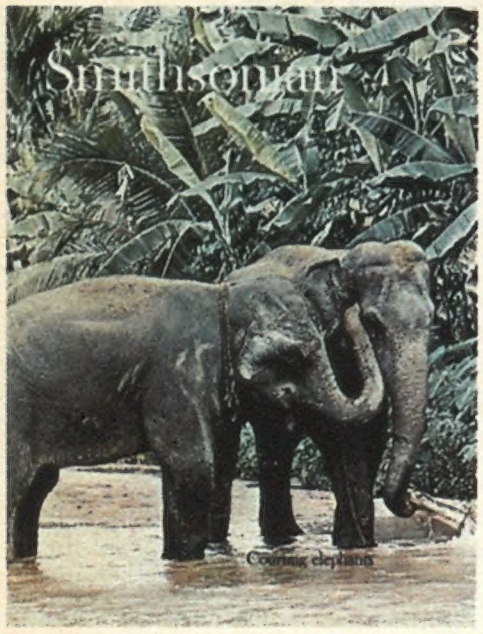
The third year of Smithsonian starts with a nostalgic look back

The covers below record Volumes I and II of the magazine, SMITHSONIAN. Not all of our readers have seen them because the circulation has grown to more than 300,000. In 1971 we published the Volume I index



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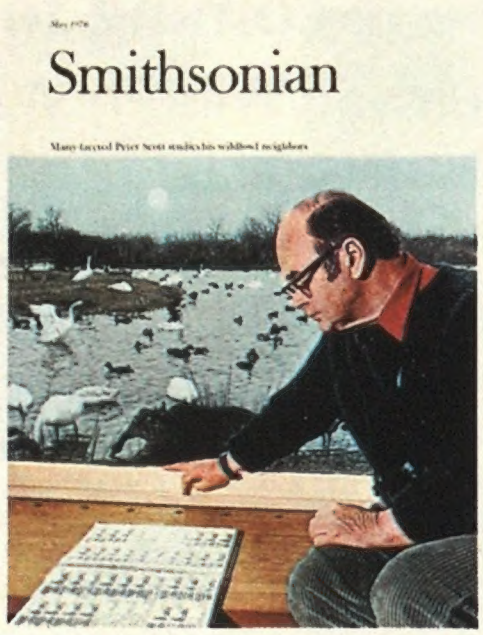

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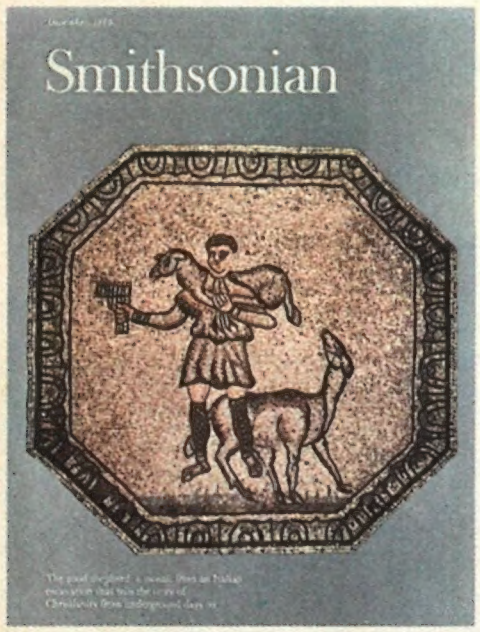

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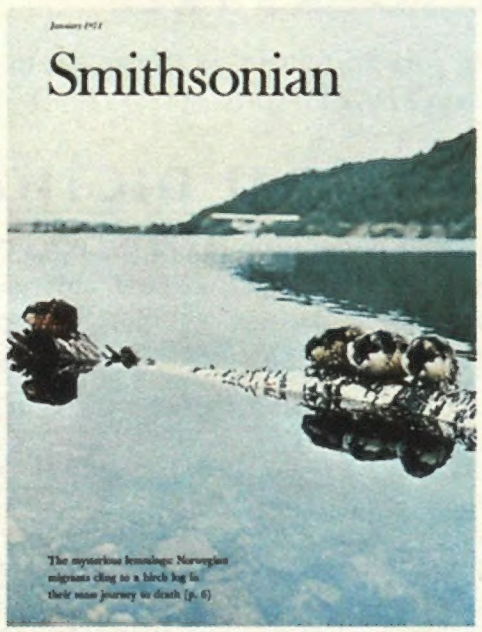

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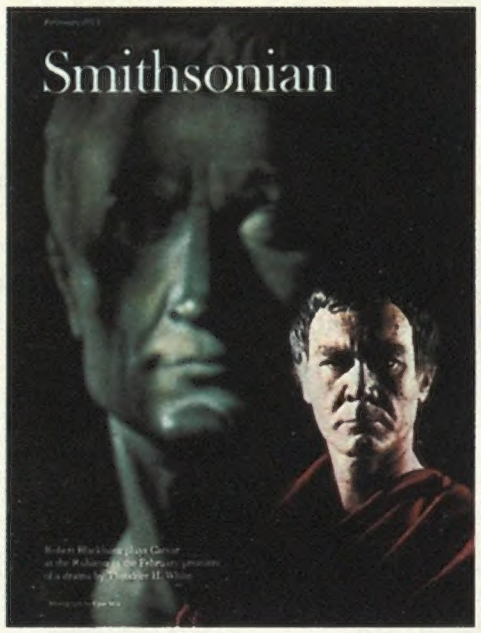

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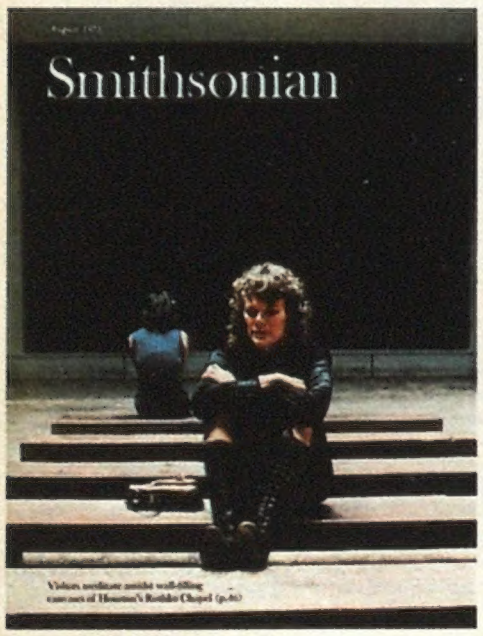

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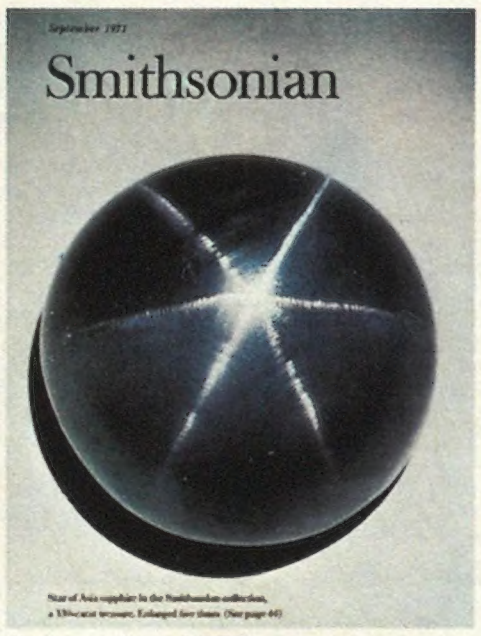

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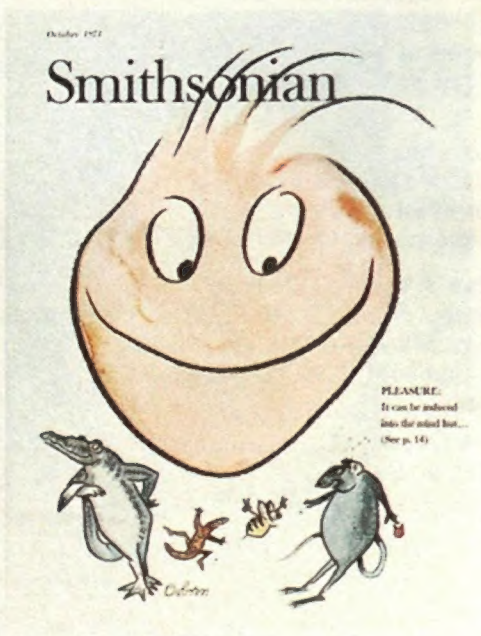

October 1971

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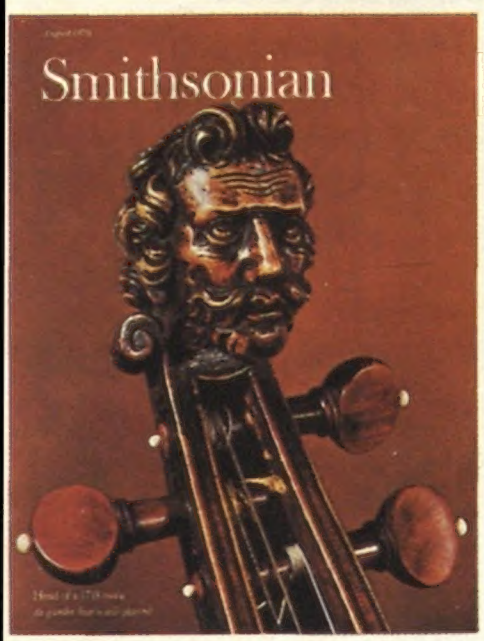
in the May issue. Now, in response to requests for a compilation easier to file, the index will be separate. An index can be obtained for $1 by writing SMITHSONIAN, Room 1363, 900 Jefferson Drive, S.W., Washington, D.C. 20560. There are a limited number of the issues shown below also available for $1 at the same address. The issues of July, August and December 1970, are out of print, however.



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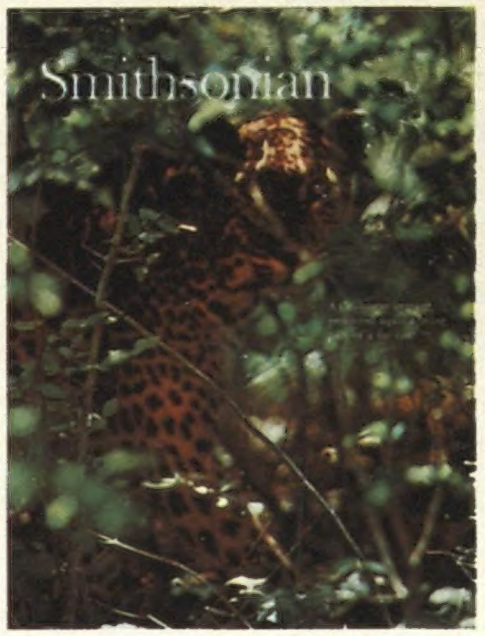

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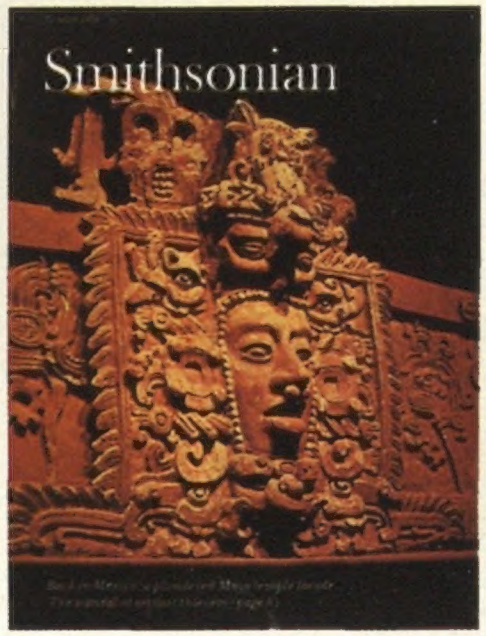

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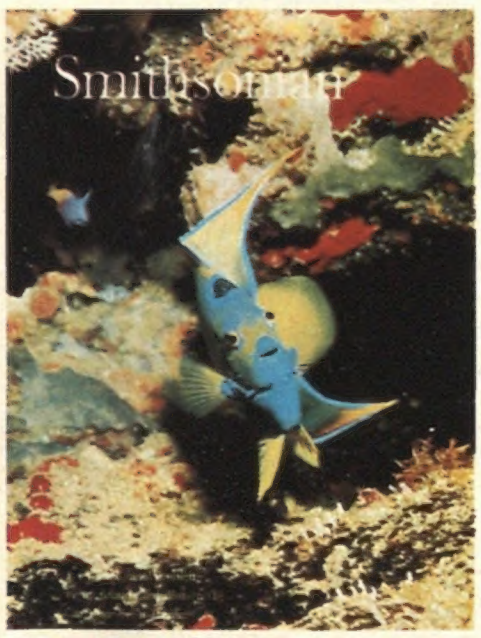

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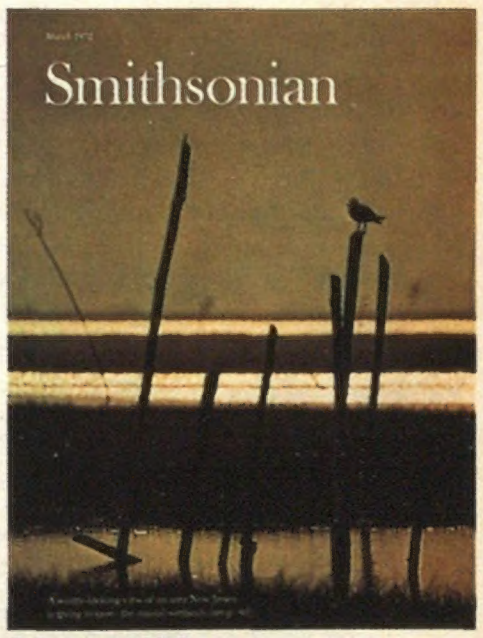

March 1972

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April 1972

Smithsonian

Volume 3, Number 1

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An old gambling hall and sporting house has lived in this high meadow since the 1870's.

By the 1970's, parts of it were moved to Denver, Pasadena, Biloxi, Duluth and Hartford.

Pity, too. Love 'em and leave 'em is the more responsible philosophy. Colorado gives you so much to find and explore and remember. Ghost towns, narrow gauge trains, real western rodeos, silenced mines and muted saloons. All wrapped up in alpine high-country splendor.

And even if anything's moveable, we'd just as soon it were left for the next guy. Or you, next trip. Our attractions kinda like it here. So will you. Come share our wonders.

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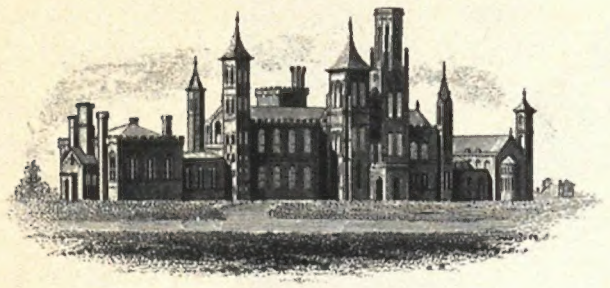
Colorado

Secretary Ripley's comments

The view from the castle



Hysteria is premature, but Man should be planning for a world without the growth of population and industry

During the winter two major reports have appeared which attempt to diagnose problems of Man's relation to his only home, our planet. One, sponsored by a distinguished British group of ecologist-conservationists, was published in the magazine *The Ecologist* and is called "A Blueprint for Survival." It has been labeled naive by *Nature,* the famous and venerable British science journal, especially for its alarm over the present state of Great Britain.

To be sure, all of us who are interested in ecology as well as the future of world civilization grow weary of Cassandralike threats of imminent doom. Couched in the language of the alarmist, such speculations do not, perhaps, enhance sensible and scholarly contemplation of our future.

A longer and more calmly presented report—but one which comes to largely the same conclusions about the globe as a whole—was sponsored by The Club of Rome, an international seminar group organized by an Italian industrialist, Aurelio Peccei.

At The Club's behest, systems analysts led by Professor Jay Forrester at the Massachusetts Institute of Technology began to develop a series of computer models based on the interrelated trends of population growth, use of natural nonrenewable resources, available land for agriculture including the generation of improved agricultural techniques, the growth of industry and the accompanying increases in industrial wastes and associated pollution.

One of the principal bases for both reports is that growth in these factors is exponential. When graphed, the curves sweep up geometrically. The results could catch us unawares.

The Club of Rome's study, carried out in its details by Dennis L. Meadows, one of Forrester's colleagues, has just been published under the title, *The Limits to Growth,* and was the subject of an all-day seminar at the Smithsonian's Woodrow Wilson International Center for Scholars on March 2.

Among its conclusions, backed by systems-analysis computer printouts, the report says: "If the present growth trends in world population [not necessarily American or British at present, for example], industrialization, pollution, food production and resource depletion continue unchanged, the limits of growth on this planet will be reached sometime within the next one hundred years. The most probable result will be a rather sudden and uncontrollable decline in both population and industrial capacity."

Secondly, calling for a state of global equilibrium, the report says: "It is possible to alter these growth trends and to establish a condition of ecological stability that is sustainable far into the future."

Thirdly: "If the world's people decide to strive for this second outcome rather than the first, the sooner they begin working to attain it, the greater will be their chances of success."

What is the answer? Planning. If politicians can plan a campaign, if businessmen can plan a company's future, surely we citizens of this world can mobilize thoughtful planners who are able to tell us how to manage our future—neither willfully nor hysterically but rationally.

S. Dillon Ripley

Before telephone installers make their first call, they get a $1,700 training course.

College education isn't the only thing that's gone up.

It now costs us twice as much to train a telephone installer as it did ten years ago.

But it's one of the best ways we know to improve your service. So we do it right.

Each of our training centers has a practice house. So a new installer can make mistakes on our wall, not yours.

There's also an 800-page textbook that suggests a right way to do everything.

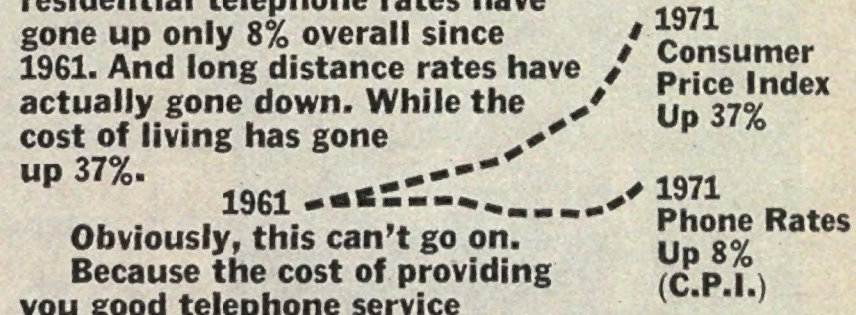
Like leaving a small "drip loop" in the outside wire to keep water from running down the side of your house.

And drilling guide holes for screws so they won't split your baseboard.

And keeping telephone wires a safe distance from electric wires to protect you from shocks.

With 20,000 new installers this year to be trained at full pay, you can see why we worry about the high cost of training.

Despite rising costs like these, residential telephone rates have gone up only 8% overall since 1961. And long distance rates have actually gone down. While the cost of living has gone up 37%.



Obviously, this can't go on.

Because the cost of providing you good telephone service is going up, telephone rates are going up, too—but based on the last ten years, far less than most things you buy.

AT&T and your local Bell Company.

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Letters to the Editor

Extinction's tide

Dear Sir: As I read Secretary Ripley's article, "Extinction's tide and the ripples and eddies of hope" in your February issue, these stanzas occurred to me:

Is it worse not to know?
The moa is fewer—in fact, it's extinct,
the dodo's a did-did (to put it succinct).

And the white-winged guan? It's guan away;
the cave bear, hyena and lion? Passé.

The hairy-chest syndrome has helped kill
the tiger;
its haunts will be hidden from God, man
and Geiger.

The houbara bustard, that royal game of old
is a Pakistan show about ready to fold.

And a potentate greedy for canard de luxe
has gobbled the last pink-headed ducks.

My prediction: Chances are nine out of ten
that we, too, will some day be just speci-men.

Ruth Boorstin
Washington, D.C.

Carrie Dorman

Dear Sir: I enjoyed your article, "The green world of Carrie Dorman," for a special reason.

I share the experience of the loose nut on the steering column of the Model-T Ford. The same thing happened to me when I was a child and was riding with my mother. We were going down a hill when suddenly Mother had the steering wheel in her hands, disconnected from the column. She shouted, "What shall I do?" I suppose it was the common sense of a child which ruled the moment, for I calmly told her to put it back on. She did, and we continued our journey.

Mrs. Mary Van Selus
Minneapolis, Minnesota

Sea mammals

Dear Sir: I am curious about the statement in your article, "Brainy mammals of the sea learn the ways of Man," that they have been used "as carriers of explosives in underwater military exercises."

The Navy has never used either sea lions, porpoises or other marine mammals for such exercises. We are falsely accused of doing this from time to time.

C. Scott Johnson
Head, (Naval) Marine Bioscience Division
San Diego, California

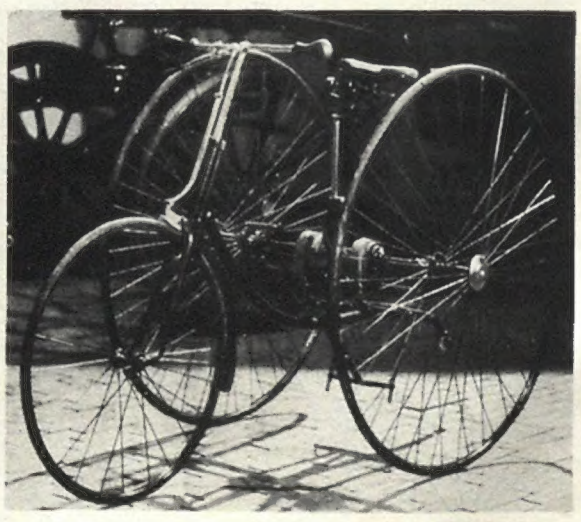
We accept Mr. Johnson's denial about use of dolphins as explosive carriers, but point out widespread references to experiments, including a recent one in Technology Review *reporting the use of "black dolphins for a classified surveillance and detection mission in Vietnam." The Navy says categorically that all underwater research is classified.* Ed.

Bicycles

Dear Sir: You say in your article, "Hezekiah Smith, builder of a 'safety' bicycle," that his experimental tricycle never caught on except as a toy.

My father had one and used it for some years, pedaling it around town for Sunday exercise. As I recall, only once did he ever encounter another. My father and the rider of the other "trike" dismounted and introduced each other.

Thomas A. Larremore
Flemington, New Jersey



The Smithsonian's adult tricycle

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Short-lived phenomena

Vanishing bales of snow, some condiments for mosquito-haters and the case of reverse pollution

Just as the March issue of SMITHSONIAN was going to press, with its cover story on New Jersey's efforts to save its wetlands, trouble struck those same wetlands. Thousands, perhaps hundreds of thousands, of dead fish were seen floating on the surface and washed up on the shore of Oyster Creek, a tributary of Barnegat Bay.

Almost all the fish were juvenile menhaden, according to a report from the Smithsonian's Center for Short-lived Phenomena; a few other species were found in very small numbers—but shrimp and some other fish species were found thriving. Normally menhaden would have gone south where the water is warmer—between 59 and 68 degrees.

But upstream from the fish kill is the Oyster Creek Nuclear Generating Station which draws almost half-a-million gallons of water a minute from Barnegat Bay and uses it as a coolant, releasing it into Oyster Creek 15 to 20 degrees warmer. The menhaden probably grew accustomed to the heated water and stayed north.

Officials of the Environmental Protection Agency (EPA) checked temperature recording equipment in the creek and found that several short but severe drops in water temperature had occurred on various days in late January—ending with a long drop of 22 degrees on January 26, when the generating station closed down for maintenance.

If the decrease in temperature killed the menhaden, this is one of the first cases of *reverse* thermal pollution.

By March EPA was preparing to ask for more research money to explore what will be a more frequent occurrence as water-hungry nuclear plants continue to be built in similar coastal areas and even, as has been proposed, in ocean waters near the shore.

The Kemmerer snow bales

Road crews, clearing the highways south of Kemmerer, Wyoming, after a January blizzard, came across hundreds of rolls of snow dotting the prairies (see photograph). The only explanation advanced so far is that pollutants from nearby industrial plants—perhaps from plants that process a mineral called trona—spread over the new-fallen snow, serving as a kind of temporary binding material.

Then, according to *The Caspar Star-Tribune,* extremely high winds simply blew the snow into bales, like rolling up

Rolled snow carpet near Casper.

a piece of carpet. One day after their appearance the snow bales were gone, buried under more snow.

Hot news for mosquitoes

Wise gardeners have always known that certain easily grown plants serve to keep out a variety of garden pests. *The Living Garden* (a calendar produced by Concern, Inc. and the Audubon Naturalist Society of the Central Atlantic States to encourage organic gardening) advises that mint will keep ants off your patio. Rosemary slows down the Mexican bean beetle. Thyme deters the cabbageworm, and marigolds drive off nematodes and several other garden pests.

Even more versatile is garlic. Not only does it inhibit affectionate human con-

When Nijinsky hits Diaghilev in the face with a 9-pound mackerel... only AUDIENCE readers know why.

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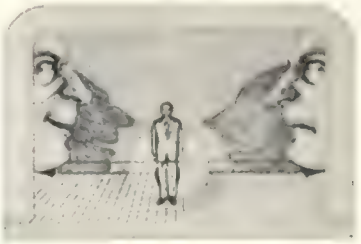

Mattel where toys are "swell" — from Uke-A-Doodle to Shoppin' Sheryl. How *Playboy* exposes the ideal Playmate of The Month.

The reason Orson Welles hurled one telephone and four blazing sterno dishes at John Houseman.

"The Eerie Art of David Frye" (or "I'm Not Telling Anyone Where Nixon Is — That's My Secret").

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A MATTER OF TASTE

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ALGREN TO UPDIKE

Here's some of the good company you share as a reader of AUDIENCE: Nelson Algren, James Baldwin, Thomas Berger, John Berryman, Vance Bourjaily, John Brooks, J. P. Donleavy, William Price Fox, Bruce Jay Friedman, John Gardner, Herbert Gold, Joseph C. Goulden, Joseph Heller, John Clellon Holmes, Benedict Kiely, Larry L. King, Arthur Miller, Alan Moorehead, Pablo Neruda, Edwin Newman, Vladimir Nabokov, Richard Rhodes, Clancy Sigal, L. E. Sissman, John Updike.

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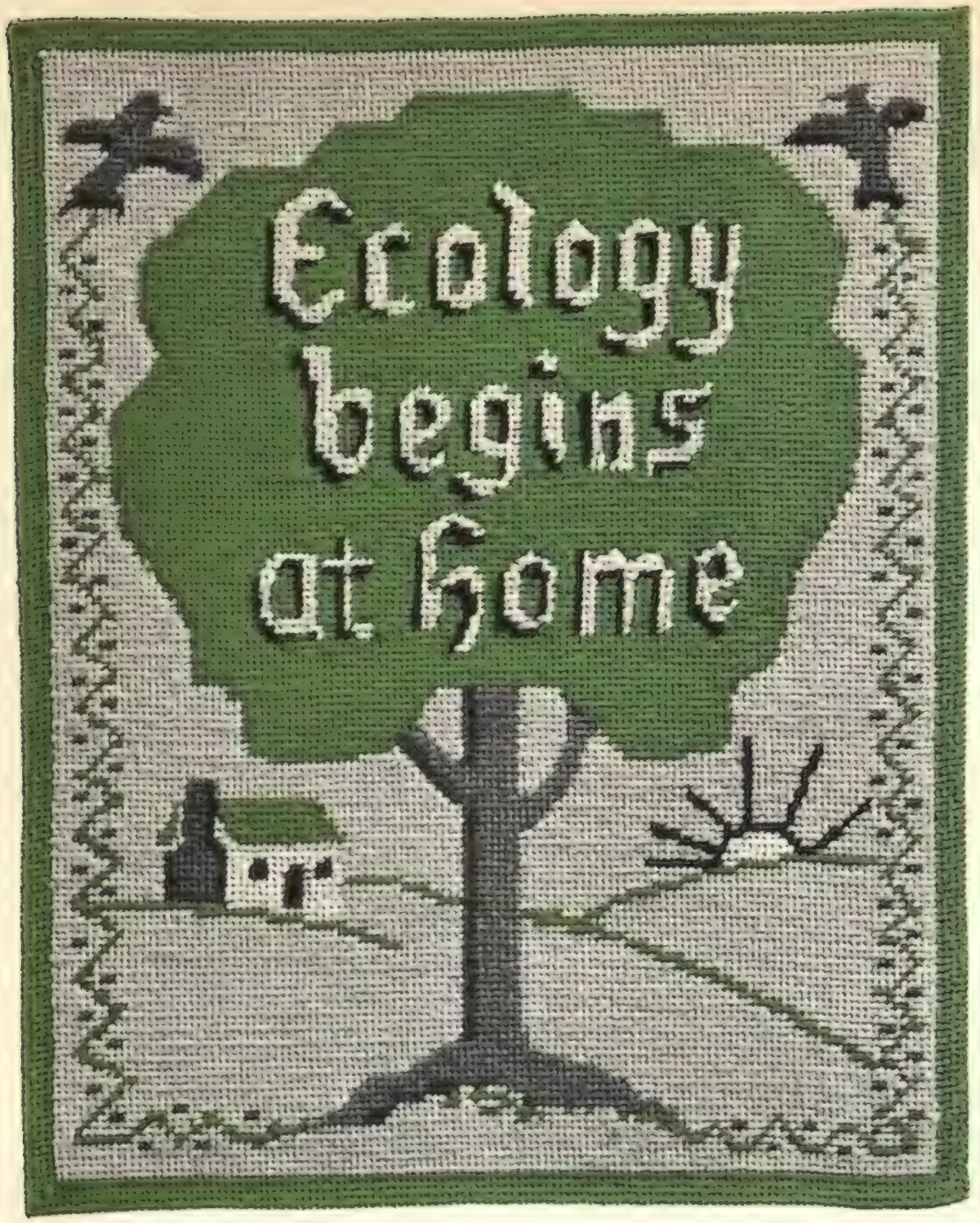

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tact, it annoys Japanese beetles and aphids and drives away mice and moles. And it might possibly replace DDT in the war against malaria.

Two years ago two young biochemists, working with Dr. Elden Reeves of the University of California, found that a very dilute solution of an oil distilled from garlic cloves killed off mosquito larvae. Now the two scientists, presently in India, reported to *Science* magazine that they have isolated the active agents in the garlic oil and have produced a synthetic mixture of the two. In natural and synthetic form, the chemicals are lethal to mosquitoes and houseflies.

If garlic is too strong for your taste (or for frogs and other mosquito predators) mustard may do just as well. Back in California, Dr. Reeves found that seeds of the mustard family exude a mucilaginous material when placed in water. Mosquito larvae are attracted to the mucilage, become inescapably stuck in it and they drown. If the seeds are heated, they still produce the fatally attractive mucilage but will not germinate, thus insuring that an area sown with the seeds will not become a mustard patch.

Suspicions confirmed

Down deep people are inclined to be jumpy about science and that is because, from time to time, some scientist comes along to tell us that what is obvious and apparent is also not true. For example, several generations of non-physicists have been raised in the nerve-racking but inexplicable knowledge that time does not necessarily pass the way we *know* it to pass from our senses.

Thus it is particularly refreshing to find occasionally that one's most simple-minded perceptions of the world are corroborated by Big Science. In this case, housewives may rejoice at the soundness of their common sense.

No less than the American Association for the Advancement of Science and the State University of New York have determined, after several months of elaborate studies using silicone-treated aluminum foil strategically placed in hundreds of houses, that the air in homes in urban areas is likely to have more particulate matter (*i.e.* dust) floating around than the air inside suburban homes. It is now proved that there is more particulate

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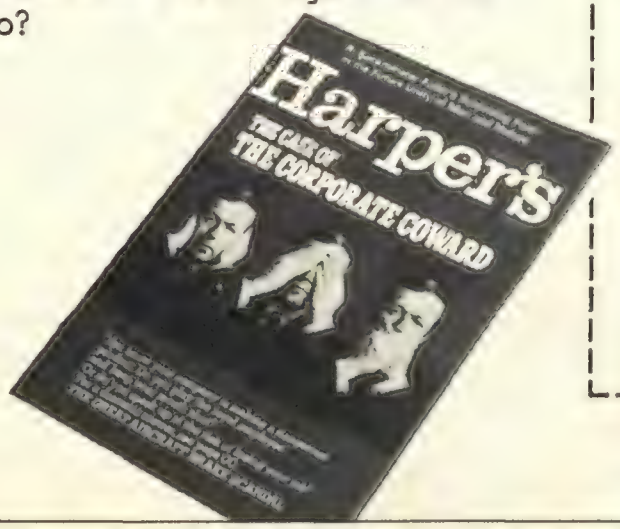
Should all drug use be legalized? Yes, says Thomas S. Szasz, M.D.—"It should be none of the government's business what drugs a man puts into his body."

What happens if Nixon wins? Will he behave differently if he at last reaches the point where he has no higher—or farther—to go?



Are the environmentalists wrong? We need more technology—not less—to save the environment, says Peter Drucker.

Is Hollywood's "new honesty" phony? A surprising look at *Carnal Knowledge, Shaft, McCabe and Mrs. Miller*, and other cinematic sacred cows.

Is sexuality in old age a myth? Simone de Beauvoir examines fascinating case histories of the great and famous in talking about something most people don't like to talk about.

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☐ **Ubeidiya** A 21-day archaeological excavation of a Middle Stone Age site near Tiberius, Israel. Chief Scientist: Dr. Ofer Bar-Yosef, Hebrew University, Israel. Cost $1275*/23 June-14 July

☐ **Ancient Gythion** An underwater archaeology expedition to survey the sunken town of ancient Gythion, the harbor of Sparta, in the Gulf of Laconia, Greece. Chief Scientist: Niki Scoufopoulos, Classics Department, Tufts University, and Director, Aegean Institute, Poros, Greece. Cost $1175*/8-29 August or 9-week program: Cost $1675*/26 June-29 August

☐ **Solar Eclipse: Canada** A 7-day astronomical observation, coronal photography, and systematic intra-Mercurial object search during a total eclipse of the sun at Prince Edward Island, Canada. Chief Scientist: Dr. Donald H. Menzel, Past Director, Harvard College Observatory. Cost $400*/5-11 July

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☐ **Bermuda** A 21-day marine archaeological excavation of a 16th century Spanish galleon off the coast of Bermuda. Scuba certificate required. Chief Scientist: Dr. Mendel Peterson, Underwater Exploration Project, Smithsonian Institution. Cost $1275*/1-21 August

☐ **Nyragongo** A 21-day field expedition to study the active lava lake of the Nyragongo volcano in the eastern Congo, Central Africa. Chief Scientist: Dr. Haroun Tazieff, Chief of Volcanological Research, CNRS, Paris. Cost $2056*/1-21 August

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☐ **Solar Eclipse: Mauritania** A 21-day astronomical expedition to observe and record the longest total solar eclipse of the 20th century from Mauritania, in the western Sahara Desert. Chief Scientist: Dr. Donald H. Menzel, Past Director, Harvard College Observatory. Cost $1490*/13 June-3 July 1973

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Phenomena continued

matter in kitchens than in the living rooms. And finally, there will be less of such stuff in your house if you keep your windows closed.

Awkward hands across the eons

If you saw a Neanderthal on the subway you probably would mistake him for just another straphanger—so it is said by some scholars who find the inhuman, brutish reconstructions of Neanderthals overdrawn. Indeed, Neanderthals are close enough to us to have had the recognizably human notion of burying their dead with flowers, as Ralph Solecki reported in SMITHSONIAN, May 1971. But Neanderthals certainly differed from *Homo sapiens,* and if you got to know a Neanderthal well enough to shake hands, his bone-crushing grip would prove it.

Dr. Jonathan H. Musgrave of Bristol, England, has subjected a large assortment of Neanderthal hand bones to detailed scrutiny, reporting his findings in the British magazine *Nature*. The Neanderthal hand, it seems, was a "squat, powerful appendage" with broad fingers and especially large muscles for moving the thumb and forefinger. His was a strong grip—but not necessarily a precise one.

For Dr. Musgrave found that in the typical Neanderthal thumb the relatively long second joint (the distal phalanx) was so tilted as to make grasping objects between the tips of the thumb and forefinger awkward, if not impossible. Instead, the Neanderthal most likely held objects by pressing them between the tip of his thumb and the *side* of his forefinger, a less efficient grip also employed by the short-thumbed monkeys and apes who have traveled even less far down the evolutionary path to modern Man's completely "opposable thumb."

Anthropologists speculate that the uniquely capable brain of modern Man evolved in tandem with his opposable thumb, suggesting a kind of two-way feedback between manual and mental dexterity. As the object-grasping, tool-making hand grew more capable, the brain grew imaginative, and vice versa.

And Neanderthals' tools and weapons were less sophisticated than those of the clever Cro-Magnon men who competed with them up to about 40,000 years ago. At that point Neanderthals died out, in part perhaps the victims of their own strong, crooked thumbs.

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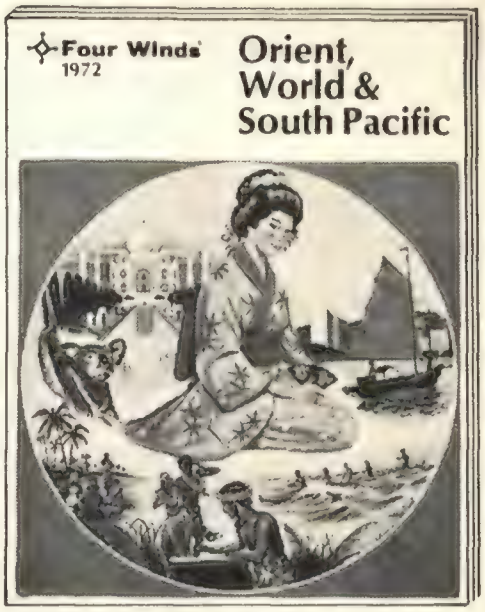

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SM2-4

By Esin Atil

A stunning display of art with a 2,500-year history

Ever since Cyrus the Great, the Persian artistic tradition has survived every new invasion and absorbed its conquerors

The kings and queens and the Vice President have long since left the barren plain of Persepolis, where they assembled in October to mark the 2,500th anniversary of the founding of the Persian Empire by Cyrus the Great. The Shah's lavish encampment has now been put to more mundane uses. But Iran's long history will continue to be honored, perhaps more lastingly, by some of the world's great museums. Among them is the Freer Gallery of Art in Washington, whose collection of Near Eastern art is internationally famous. In recognition of the anniversary, the Freer has opened a special exhibition of its Persian treasures, which will remain on view through the end of 1972.

Those who are chiefly familiar with the traditions of Western art often find the arts of the East perplexing; they seem to require more knowledge than the average person has of the history and culture of the peoples who created them. But this is not necessarily true of Persian art, where technical and esthetic perfection is often the sole reason for its existence. (The word "Persian" is used, rather than "Iranian," because it includes the art of regions which at one time or another were part of the cultural entity of Persia but fall outside the political boundaries of modern Iran.)

Any art object from the Persian world can be appreciated on several levels. Initially, one admires it as

Dr. Atil is assistant curator of Near Eastern art at the Freer Gallery and organizer of its current Persian commemorative exhibition.

Photographed by Raymond A. Schwartz

a beautifully made piece with graceful proportions and lavish decoration; then a message may become apparent, either in the form of an inscription or—more frequently—in the representation of figures carrying out specific activities; and, finally, it can be interpreted as reflecting the characteristic themes of its period or place of origin.

Nevertheless, Persian art demands considerable time and attention. The intricacy of design and highly refined execution force one to look at it in detail. After the first enchanted reaction, one is prompted to find out what makes it so exquisite—to trace the designs and study the techniques. The fact that it yields up its pleasures only at close range makes it an especially intimate form of art. And Persian art *is* meant to give pleasure to the beholder. We are delighted by the world of fantasy created in the miniatures, where heavenly gardens and lavishly adorned pavilions are occupied by romantic heroes and heroines; we are amazed by the harmonious blend of figures and designs in the pottery and metalwork.

An aristocratic art

Although many forms and materials were used by the Persians, it is perhaps the art of the book that represents their supreme accomplishment. These volumes of religious, historical, epic and poetic works, copied and illustrated time and time again, made use of the most elegant techniques of bookbinding, calligraphy, illumination and miniature painting. Throughout Persian history, without exception, rulers brought to their courts the most famous and gifted poets, calligraphers and painters, and commissioned them to execute manuscripts for their libraries. Persian art is thus essentially an aristocratic art, developed under the patronage of the ruler and created for his pleasure before anyone else's.

The history of Persia itself is as complex and fascinating as the 2,500-year-old artistic tradition that begins with the Achaemenid Empire of Cyrus the Great—which is best represented by the familiar and monumental reliefs at Persepolis. These great stone friezes ingeniously combine stylization with realism, especially in the depiction of animals.

After the Achaemenid Empire succumbed to the armies of Alexander the Great in 331 B.C., the classical Greek style begins to be incorporated into existing local traditions. This dualism continues in the art of

Old Man and Youth in Landscape, signed by Behzad. Frontispiece of a manuscript from Herat dated 1524; the original is only about three-fifths this size.

The Marriage of Mihr and Nahid, from an allegorical manuscript produced in Bukhara and dated 1523. Mihr (the Sun) is marrying the daughter of Kaywan (Saturn). It reveals a continuation of the late Herat style in Bukhara after the Uzbek invasion of Persia (1507).

the Parthians, who overran Persia following the collapse of Greek rule after the death of Alexander. Among the objects in the exhibition from the Parthian period is a singularly beautiful head of a young woman, in repoussé silver, which clearly shows a mixture of Eastern and Western elements (page 23).

The Sasanians, a local dynasty that replaced the Parthians in A.D. 224, continued to some degree this mixture of Eastern and Western themes. Many of their silver objects, for example—plates, bowls, vases—show elements of Greek Dionysiac rites combined with those of Zoroastrianism, the Sasanian state religion.

With the invasion of the Arabs from the West in A.D. 651, the long Sasanian rule came to an end and Islam swept across Persia, bringing with it great and distinctive changes. New themes and concepts blossomed in the arts. Foremost among the innovations were those caused by the impact of the Koran, the holy book of Islam, followed by the need for new buildings to be used by the faithful; the mosque for prayer, the *madrasah* for theological teaching.

It is *only* in religious art that Islam prohibits the representation of the human figure, the reason being to keep divine contemplation free of the distractions of idols or icons. This restriction, plus the fact that indoctrination was based solely on the words of Allah as recorded in the Koran, meant that calligraphy—the fine art of writing—came to the fore as the essence of Islamic religious art. Those who made copies of the Koran and inscribed the verses adorning the mosques became the most highly esteemed artists in the society. Their art developed many extremely complex forms, which at times became so abstract and stylized that only the most expert epigraphers can decipher them.

A gold bracelet from the late 10th or 11th century. The conical projections are wound with twisted wire; four pairs of stylized peacocks make the clasp.

Islam's unique contribution

Aside from calligraphy, the only other form of decoration used in religious art and architecture was the arabesque—a unique creation of the Islamic world whose name indicates its origin. Whether floral (as in the border surrounding the painting on pages 16-17), or geometric, intricately refined motifs weave in and out, forming a delicate network which can be endlessly extended. Perhaps it is in the infinity of the arabesque that we can best feel the mysticism of Islam.

Calligraphy and arabesques were used in both religious and secular art. We find them in bookbindings, illuminations and miniatures; on ceramics, metalwork, glass, textiles and carpets; and in all types of architectural decoration, from stucco and brickwork to tiles and painted panels. The tenth-century ceramics from the northeastern regions of Persia frequently use proverbs or conventional expressions of good wishes as decoration. In the center of some of these there is a

An early 13th-century beaker from Rayy, decorated with an episode from the *Shahnameh*. It casts some light on the initial stages of Persian painting.

delicately worked out knot; on others the sides have been pierced in a decorative pattern with transparent glaze filling in the holes, so that its elegance is visible only when the piece is held up to the light.

Similar features appear in the art of the Persian goldsmiths. A ewer bears an inscription on the rim giving the name of the ruler who commissioned it, while animals and arabesques decorate the body. In a beautifully executed gold bracelet (page 19), four pairs of peacocks sit on the clasp.

Following the arrival of the Seljuk Turks from Central Asia in the middle of the 11th century A.D., Persia witnessed another great surge of artistic activity. Potters and metalworkers developed new techniques and themes to satisfy the demands of their new patrons. One exceptionally remarkable example is a beaker (page 19) decorated with three bands of scenes from the *Shahnameh* ("Book of Kings"), an epic history of Persia written by Firdausi circa A.D. 1000. This beaker has been dated to the early 13th century, making it about 100 years older than the earliest known miniature illustrations of the book. Its existence indicates that by the 13th century the *Shahnameh* had already been illustrated, and that there were sufficient examples of miniature paintings on hand to serve as models for the pottery.

The great miniature-painting tradition of Persia did not fully develop, however, until the 14th century, after the Mongol conquest of the Near East under the armies of Jenghiz Khan. The Mongols, like the Seljuks before them, came from Central Asia. At first

The Bier of Alexander the Great, early 14th century, from Tabriz. Aristotle stands at the head of the bier, Alexander's stricken mother kneels beside it.

they brought great destruction to the cultural centers of Persia, but after their conversion to Islam they became avid patrons of the arts and introduced new Far Eastern elements into the artistic vocabulary.

Under the Mongols, who called themselves the Ilkhanids (meaning the first khans or rulers), a great manuscript center developed in their capital at Tabriz. It produced illustrated histories, books on animals, and several copies of the *Shahnameh*. The most spectacular example from this period is a large *Shahnameh* whose miniatures have long since been dispersed into various collections. One of them, now in the Freer, shows Alexander the Great on his bier, surrounded by his mother, his friend and teacher Aristotle and his grieving subjects (pages 20-21). Through all the dynasties that succeeded his own brief rule, Alexander remained a favorite theme of Persian art, and this treatment of the subject is outstanding in its dramatic and emotional impact.

At the end of the 14th century Persia suffered still another invasion from the East, this time by the armies of Timur, or Tamerlane, as he is commonly known in the West. Once again history repeated itself; the most eminent artists and scholars were summoned to the courts of Timur's successors in Herat (now in Afghanistan) and Shiraz, and there they created the greatest works of art Persia had yet produced.

The immense manuscript activity of the 15th century was marked by the teamwork of the most renowned calligraphers, bookbinders, illuminators and miniaturists, whose efforts were often united in the creation of a single manuscript. But in contrast to earlier times, when the emphasis was on historical and epic texts, lyric and mystical poetry became more popular. The height of Timurid painting was reached at the end of the 15th century in the court of the last ruler of Herat, Sultan Husayin Mirza (1468-1506).

At that point the Timurids, like all their predecessors, went under. Their conquerors were the Uzbeks from the northeast, who carried off many of the artists in Herat to their own capital at Bukhara. All the characteristics that had flowered in Herat under the guidance of the famous miniaturist Behzad—the naturalism of landscape, the individualization of figures, the great range of composition combined with exquisite technique—were transmitted to Bukhara.

The Uzbeks were succeeded in a few years by the last Persian dynasty with which we are concerned here, the Safavid. When its founder, Shah Ismail, took Herat from the Uzbeks, Behzad himself was captured and placed in charge of the imperial library at Tabriz.

Whatever the political upheavals, the Persian artistic tradition remained unbroken. Under the Safavids Herat and Shiraz resumed their old importance as centers of artistic activity, even though the capital was now Tabriz. From there it moved to Kazwin and then to Isfahan, which under Shah Abbas (1587-1627) entered a golden age. It produced the jewel-like buildings, glittering with gold and colored tiles, which still make Isfahan one of the fabled cities of the world. The miniature tradition developed new interests, and artists began to execute single paintings and drawings to be pasted into albums.

In the 16th and 17th centuries, too, more and more artists began to sign their works with their own names, in contrast to earlier practice when the miniatures had been produced by studios of anonymous painters. An example of this is the *Old Man and Youth in Landscape* (pages 16-17), the frontispiece from an anthology dated 1524 and signed by the celebrated Behzad.

But the 18th century showed a preference for wall paintings and large Western-inspired panels, which eventually brought an end to the great Persian tradition of miniature painting.

Throughout its long history, the indigenous art of Persia has triumphantly survived the political and ideological conquests of both East and West. Each new invasion introduced new concepts and traditions, but these were always absorbed and integrated into a cultural heritage that remained intrinsically Persian. From the West came Alexander the Great, followed by the Muslim Arabs; from the East came the Seljuks, the Mongols and the Timurids. The remarkable thing is that all of them eventually became more Persian than the Persians, captivated as they were by the land they sought to conquer.

A blend of Hellenistic and Eastern influences, this beautiful silver head is probably Parthian, executed between the first centuries B.C. and A.D.

By Rice Odell

To stop highways some citizens take to the streets

In an attempt to save their communities from the bulldozer, Washingtonians in growing numbers have adopted strong tactics

Angela Rooney, a pretty Washington, D.C., housewife, stands in her kitchen grilling a cheese sandwich, mixing a salad and giving a postgraduate discourse on practical political science—on the lessons learned in more than seven years of hard-core citizen opposition to freeways in the nation's Capital.

"You really find out what's wrong with America," she says, ". . . the greed for land . . . the blighting of a neighborhood . . . the exploitation . . . the deceptions and rationalizations they use to justify it . . . the ugliness of it . . . the fundamental question of whether individuals have any rights any more."

Mrs. Rooney's involvement with the bitter, running freeway dispute was almost inadvertent. The wife of an art professor at Catholic University of America, she was herself an artist and actress. And she was nonpolitical. "I'd never been to a public hearing."

Then in November 1964 her husband Tom came home with news of a plan to build a freeway through the edge of their community of Brookland in the northeast section of the city. She wrote a long letter to the three Commissioners who then governed the city

Between battles, Washington, D.C., housewife Mrs. Angela Rooney spouts practical politics from

under the aegis of Congress (it is now administered by a mayor and city council of nine members, all appointed by the President). "I got a long reply back with all the reasons, but the whole thing was so inept I thought I'd better look into it."

She found that the 8.85-mile North Central Freeway into Maryland was to be a link in the vaunted Interstate Highway System; that it was part of a whole network of loop and radial highways proposed for the area; that much of the North Central segment would be *ten lanes* of concrete; that it would uproot several thousand people from their homes and displace more than 100 businesses; would disrupt half a dozen communities, isolating them from Catholic University or other parts of the city to which they relate; and would generally pollute a wide path through the area.

A few weeks later, Mrs. Rooney found herself testifying at a public hearing, and she was committed to the long haul. She also found that many other citizens along the proposed route were aroused and were coming out fighting.

They were concerned not only with their homes, but with their way of life and the integrity of communities they valued. Brookland, for example, is the kind of community which governmental agencies and "experts" strive to patch together, but seldom do. With a population of 9,297, Brookland is a stable community which has integrated with reasonable success (the population is 86 percent black now). "It was middle-class white before," says Dr. Paul Peachey, chairman of the Sociology Department at Catholic University, "but it made the transition, keeping the same class characteristics. But if unwise decisions are made from outside, the people don't have a chance." To Mrs. Rooney and the others, few things could be more unwise than the intrusion of a freeway.

Freeways, she says, leave a "wake of dead-ended streets and suffocated communities." They are barriers that "erode community interdependence and identification. We're encouraging the creation of a rootless, mobile society that has no sense of responsibility, rich or poor. This is what it's all about. I see no way to go but down unless we stop it."

Mrs. Rooney's experience is not uncommon, and her

her kitchen (left) and revels at the partly-built, court-delayed Three Sisters Bridge.

Citizen activists staged an antibridge demonstration in 1969, but it took a judge to halt construction.

response is becoming less uncommon. Throughout the country, as urban neighborhoods are threatened by highways, power plants, large developments and the like, citizens are banding together to take the offensive. Often coupling their own desperation with the radical organizing techniques of such urban activists as Saul Alinsky, and using the courts as well as the streets, citizen groups are springing up in opposition. Anathema to most local governments and development agencies, these groups are an increasingly important force to reckon with. Mrs. Rooney and her neighbors were soon to be part of such a group.

Takoma Park, a community which straddles the line dividing the District of Columbia and Maryland, is much like Mrs. Rooney's Brookland. And it, too, is in the path of the proposed North Central Freeway.

One of the citizens of Takoma Park is a 64-year-old commercial artist named Sammie Abdullah Abbott. When Abbott returned from work on Friday, November 13, 1964, his wife told him, "Sit down, I want to tell you something." Lane No. 3 of the North Central Freeway was programmed through his livingroom and that of his widowed mother-in-law in the next block. He and his father-in-law had built both houses with their own hands.

"I almost hit the ceiling," says Abbott, a veteran political activist and civil rights worker. That same night he attended a local citizens' association meeting, and thus began *his* long campaign against highways.

Also in the ranks of the rapidly forming antifreeway forces were many blacks—blacks whose homes were to be taken, black civic leaders and black churchmen. They were a major source of the neighborhood ferment that rose against the freeway plans. Existing civic groups girded for battle, and new organizations sprang up. Abbott and others soon reasoned that a joint effort was needed for maximum political effect.

Moreover, recalls Abbott, "some of the organizations, with their middle-class professionals, were tied up in parliamentary procedure. Everything had to be relayed back to the constituent organizations, and no decisions were forthcoming."

A new organization was needed, and in mid-1965, some 125 citizens met in a church in Takoma Park and formed the Emergency Committee on the Transportation Crisis (ECTC), to coordinate the actions of all the groups fighting freeways and supporting mass transit.

ECTC developed as a loose and freewheeling organization, without formal membership or dues. It operates with no rigid structure or line of command. People take the initiative as the need arises or the mood strikes. Much of ECTC's dynamism is generated by Abbott. With the understated title of "Publicity Director" of ECTC, Abbott wades in where others long feared to get their feet wet. Blunt and abrasive, he uses his rasping voice and prodigious supply of arguments to poke and tongue-lash ECTC's opponents. If he is their bête noire, to his colleagues he is a highly respected leader.

Rice Odell writes the "CF Letter" which is published monthly by the Conservation Foundation.

ECTC quickly adopted a key policy: no more of the traditional piecemeal opposition to particular highways in particular neighborhoods. "It had been a localized thing," says Johnie D. Wilson, a vice chairman of ECTC. "People said, 'Just don't bring it through *my* area. Move it over a little farther.' But we began to move to another level—that it's bad wherever it's going." Thus the first ECTC slogan became "not another inch of freeway."

This hard-nosed, uncompromising stand, from which ECTC has never deviated, startled Washington officialdom, long used to a diet of polite compromises and the concept of a "balanced transportation system" consisting of both highways and rapid transit. "We don't believe in compromising with a bad system," says Mrs. Rooney.

ECTC reasoned that since all segments of the area's highway network were to be connected, construction of any single segment would increase pressure to build the others. Conversely, any unbuilt section would be a gap strangling the flow of traffic into the other sections. A key example is the proposed Three Sisters Bridge, a controversial project to span the Potomac River just upstream from Georgetown. The highway department sees this river crossing as an essential link between other highway projects planned on both sides of the river.

The second rationale for ECTC's adamant stand is that opposition to all sections of the highway system brings quid-pro-quo support from all over the city. It led to a situation in which residents of white and affluent Georgetown worked against the North Central Freeway, and blacks from the other side of the city have been in the forefront of the fight against the Three Sisters Bridge. In addition, more and more suburbanites and their governments began to line up against the freeway program.

ECTC and similar organizations found themselves up against a solid wall of prohighway forces. These included Congress, particularly a bloc of powerful Congressmen determined to see the freeways built, the *Washington Star* and usually the *Washington Post,* the Washington Board of Trade and a host of other

Artist's sketch of Three Sisters Bridge: The highway department still intends to see it built.

The citizens' loudest spokesman, Sam Abbott, glowers at a District of Columbia council hearing.

business and automotive groups, the D.C. Highway Department and other highway planners, a blue-ribbon civic organization, the Federal City Council, and various governmental and civic bodies in the suburbs. At one time or another, these were joined by the President of the United States, the mayor and city council of Washington, the Secretary of Transportation and the National Capital Planning Commission.

Oversimplified, the freeway proposals have been justified with broad concepts of "progress" and "economic growth" (particularly the health of downtown business) and, most importantly, the capacity to move increasing thousands of commuting suburbanites in and out of the city.

The opponents say the subways should be built first, then the situation reevaluated. They argue there isn't enough parking to take care of the cars, that pollution and esthetic blight will be unacceptable, that the costs are insupportable and that if it takes commuters longer to drive that is too bad, but it is no excuse for throwing out of their homes thousands of people who would get no benefits.

ECTC would like to see the huge Highway Trust Fund used for public transportation—and eventually free transportation. "Transportation is a social problem," Abbott says. "It's not just the poor, it's everybody. It involves the whole fabric of a community, its mobility and its commerce. Leaving the solution to each person on a hit-or-miss basis leaves people constantly in debt to the car."

Activist conservationists

To make its points, ECTC prints leaflets and publishes bulletins. It even has an anthem to sing when the moment is ripe and has organized numerous protest marches, picket lines and press conferences, relying on the graphic artistry of Abbott for cartoons, posters and placards. It has also reached to other cities with highway problems. It held two major transportation conferences in Washington and formed the National Coalition on the Transportation Crisis to aid antihighway citizen groups around the country.

ECTC has used almost every tactic in the book short of violence, which it disavows. When the District government confiscated and boarded up 69 Brookland homes in the path of the North Capital Freeway, ECTC staged a protest meeting to "reopen" them to residents. Four were arrested.

After the homes, still off limits, had long been vacant and vandalized, ECTC held a renovation party and the boarded-up houses still bear the brightly colored "murals" (see p. 29).

Gradually, as more and more racial animosity festered in the nation's cities, race became a stronger rallying point for ECTC. "Our analysis," says Abbott, "was that the freeways had to be fought at their weakest link—the displacement of blacks in D.C." More militant black leaders such as Reginald H. Booker, now ECTC chairman, became active with the group. A new and powerful war cry was born and carried on ECTC bulletins, placards and in loud voices: "There shall be no more white men's roads through black men's homes!"

To the blacks it was "institutional white racism" to have white men living in the suburbs making plans for their communities. Not only are blacks uprooted from their homes of long standing, but they receive what they consider less than fair market value and then are unable to find alternative housing.

By and large each side has had an abiding disrespect for the other. The merits of the dispute are argued seriously and at length—spiced with statistics and studies and surveys—but not without barbs of ridicule dished out by both sides. To the highway proponents, the citizens were usually a band of nondescript troublemakers, a small minority speaking for no one but themselves (in response to which they challenged the opposition to name a single citizens' association in Washington favoring the highway program).

Congressman William H. Natcher, a Kentucky Democrat, is chairman of the D.C. House Appropriations subcommittee and tried to hold up funds for the subway until the Three Sisters Bridge and other highways were authorized. He recently commented on the House floor that some of the activists are "right unusual people"—probably the tamest aspersion leveled at them in seven years.

At the very least in a generally voteless city, ECTC has insisted on being heard, badgering reluctant officials until they meet with its members or hold public hearings. Its leaders have grabbed microphones and disrupted meetings to this end.

"People listen to those who talk the loudest and make the most noise," says Wilson. "I'm not saying it should be that way, but that seems to be the only way our country operates."

At one scheduled district meeting, Abbott called loud attention to the absence of *all three* commissioners. Also, ECTC has often concluded that the government officials themselves were violating established laws of procedure. Four times between 1966 and 1971 the U.S. Court of Appeals has supported these citizen contentions. At one point, the court had enjoined construction work on four projects, including North Central and Three Sisters Bridge.

Hanging in there till the end

The entire matter of Washington's transportation system has been in and out of court repeatedly. Congress has recently voted to separate the subway funds from the highway controversy, but the highways are still planned. When will it all end? "You can't win any battle completely until alternative means of transportation are provided," says Abbott.

Mrs. Etta Mae Davis, also of Takoma Park, has been busily involved in the struggle for all of its more than seven years. She would like to see it over: "How I long for the days of Girl Scout troops, Red Cross volunteering, short civic commitments, church projects and the serious study of music before I get too old."

But there is no sign of a letup by ECTC, the other antifreeway organizations or the growing mass of citizens they represent.

"White men's roads through black men's homes," howl the activists who protested by decorating these condemned houses, still vacant though the freeway threatening them has now been put off.

By Emmet John Hughes

FDR set own style of the office, but Lincoln still walks

Roosevelt and all who followed have left their impact upon the White House; yet Abe is still dominant. Conclusion of a two-part article

Less than a fortnight after Franklin D. Roosevelt's inauguration in 1933, William Allen White was writing to historian Allan Nevins: "My feeling about Roosevelt [is] that it is not so much what he does as the way he does it. The people will forgive mistakes. They will not forgive inaction, debate, cowardice, dilettante hesitation, splitting hairs."

Months before, FDR had given the nation, immediately upon his nomination, a clear sign of his sense of the *way* to do things politically—and dramatically. Discarding the venerable ritual of all previous Presidential nominees—frozen in a pose of silence, until formally advised of their selection some weeks later—he had flown to the Democratic Convention in Chicago to become the first Presidential nominee ever to deliver a speech of acceptance in person. He left the delegates happy and hoarse from cheering his vow: "I pledge you, I pledge myself, to a new deal for the American people." And while his future biographers might debate the merits of many aspects of the New Deal, all would have to agree that, after him, the Presidency itself could never be quite the same.

"Ring around a Roosevelt, pockets full of dough." So Clifford Berryman twitted the burgeoning agencies. Meanwhile FDR maintained his common touch (left).

Roosevelt's Presidential style was not unstudied, for he and his counselors shared an almost joyous sense of political theater. "No cosmic dramatist," Robert E. Sherwood said long after, "could possibly devise a better entrance for a new President—or a new Dictator, or a new Messiah—than that accorded to Franklin Delano Roosevelt. . . . Herbert Hoover was, in the parlance of vaudeville, 'a good act to follow.' Roosevelt rode in on a wheel chair instead of a white horse, but the roll of drums and the thunderclaps which attended him were positively Wagnerian. . . ." The political setting was perfect, indeed, for letting a President loose. "The whole country is with him, just so he does something," as Will Rogers said. "If he burned down the Capitol, we would cheer and say, 'Well, we at least got a fire started anyhow.' "

This sort of franchise for leadership was not wasted on a Roosevelt. He took due note of it, and gave soft warning of ventures to come. One declaration in his first inaugural sounded deceptively innocent: "Our Constitution is so simple and practical that it is possible always to meet extraordinary needs by changes in emphasis and arrangement without loss of essential form." In plainer words, this President was ready at once to reach for the joker in the deck of Constitutional powers.

To rally "the credulous crowd" so distrusted by Hoover, FDR relied on the readiest weapons—his own words—with the cry, "The only thing we have to fear is fear itself." An aphorism that was more a sound than a thought, it nonetheless was delivered with a zest that exhilarated the same millions of Americans who would have discarded it, if murmured by a Hoover, as one more reason to suspect their President of mindless euphoria. With the soar of slogans and the series of "fireside chats" to the nation, Roosevelt courted and mastered the press that had left Hoover so estranged. *The New York Times'* Arthur Krock judged him the shrewdest reader of newspapers he had ever seen in the Oval Office. Welcoming direct oral questions in press conference, despite the nervous disapproval of his own advisers, he came close to mesmerizing the correspondents with his commanding personality. As Leo Rosten later recalled: "His answers were swift, positive, illuminating. . . . He was lavish in his confidences and 'background information.' He was informal, communicative, gay."

But the apparent political magic was not wrought

Besides writing books and articles, the author lectures on the Presidency at the Eagleton Institute of Politics at Rutgers University.

Triumphant Truman chortles at the premature celebration of his defeat in 1948.

An ebullient Eisenhower recuperates from heart attack that failed to shake public confidence.

by words alone. Quite as swiftly, there came the astonishing array of New Deal proposals that sent the 73rd Congress into 100 days of frenzy. The sequence began with an emergency banking bill dispatched with such speed that it was never properly printed; rushed to Capitol Hill in some half-dozen typewritten texts, bearing penciled notes and corrections, it passed the House of Representatives in less than 40 minutes.

Headline writers could barely keep pace with lawmakers: AAA subsidies to farmers, NRA codes for business, relief for unemployed, loans for homeowners, safeguards of "Truth in Securities," promises of the Tennessee Valley Authority. Amid the Congressional fireworks, some Senators fretted over the long-range implications of this carnival of Presidential initiatives. But Harry Hopkins, who would become Roosevelt's closest counselor, once snapped the retort: "People don't eat 'in the long run.' They eat every day."

Hopkins' words caught Roosevelt's spirit of relentless pragmatism. "Let's concentrate upon one thing," he said to Secretary of Commerce Daniel C. Roper, "save the people and the nation and, if we have to change our minds twice every day to accomplish that end, we should do it." He told the White House press corps that he fully intended to play the Presidential role like a football quarterback, unburdened by any rigid game plan, since "future plays will depend on how the next one works." This was the kind of talk that long since had driven Hoover, with a rare flash of wit, to call his successor a "chameleon on plaid." And it impelled H. L. Mencken to report of Roosevelt: "If he became convinced tomorrow that coming out for cannibalism would get him the votes he so sorely needs, he would begin fattening a missionary in the White House backyard come Wednesday."

How to fight temperament

Both the exuberance of FDR and the exasperation of his critics celebrated, with opposite feelings, the driving force of the New Deal. At its heart, as Richard Hofstadter later observed, "there was not a philosophy but a temperament." Once asked by a reporter to state his philosophy, Roosevelt jauntily described himself as "a Christian and a Democrat—that's all." Such nonchalance only increased the torment of his opponents. They might hope to expose an obnoxious "philosophy," but how fight an insidious "temperament?"

This President's sovereign purpose was not to create a national program, but to quicken a national mood. On his renomination in 1936, he raised a toast to his own first term: "Better the occasional faults of a Government that lives in a spirit of charity than the constant omissions of a Government frozen in the ice of its own indifference." This confident self-absolution—

The Kennedys, handsome, young, vital,
raised people's hopes to the concept of Camelot.

and the popular acceptance of it—allowed FDR to practice his political artistry, shifting speed, changing course, swerving without breaking loose from the trust of most of the electorate. He could proclaim in the mid-1930s America's perpetual neutrality, yet stand forth in the 1940s as the happiest warrior of the Western world. He could pursue, as late as 1935, economic policies that left labor leaders in a fury, yet convert these same leaders into a dedicated Democratic coalition.

The audacity and inventiveness of this Presidential style accomplished something more important than the political endurance of Franklin Roosevelt: It made probable the survival of the two-party system of government. Even as FDR was being attacked for subverting the system he was, in fact, saving it. The economic crisis at the end of the 1920s had driven not merely the impoverished and jobless, but also a legion of liberals and intellectuals, to despair of a political solution. The most impassioned liberal critics—from John Dewey and Stephen Vincent Benét to Reinhold Niebuhr and Lewis Mumford—had announced the death of the "old politics" and dismissed Roosevelt as a sign of all that was vain and gone. To Heywood Broun, he had been no more than "the corkscrew candidate." To Walter Lippmann, he had appeared "a pleasant man . . . without any important qualifications for the office." Yet, by 1939, Harold Laski saluted Roosevelt: "He has dramatized the issues upon which men know that their lives depend."

This achievement might be judged this President's greatest service: the holding of the wide American audience to witness the repertoire of programs performed by a versatile democracy—in a theater that seemed afire. There was no undue arrogance in Roosevelt's boast to Orson Welles that they were the two best actors in the nation.

What shapes any Presidential style? There can be no infallible formulas in this presidential year, for it is not a matter of prescriptions, but of perceptions—a question not of designs, but of senses. And there appear certain specific *senses* of political life which set the tone of all Presidential leadership. Thus . . .

A sense of confidence. The President may make a public display of almost any emotion from rage to grief with no harm to his leadership so fateful as a show of hesitation. Citizens may be aware of the uncertainties that accompany his every policy. But they look to him not for doubts but for decisions.

In 1960 Dwight Eisenhower, the oldest President to live in the White House, gave over his powers to John Kennedy, the youngest of all men elected to the office.

Eisenhower's maturity and experience had so affected the nation through eight years that he could claim a popular trust unmatched by any other President of the 20th century. Kennedy's youth and vitality excited a new kind of confidence, with a vision to "get America moving again" in brave new directions. The brief blaze of hopes marking the New Frontier were not ignited by lavish promises or grandiose programs, but by what one aide of the young President has described as Kennedy's gift for "raising people's *confidence* about their own capacities and about the country's."

A sense of proportion. Without some disciplining sense, the most confident Presidents would habitually blunder beyond the bounds of political reason—as the boldest at times have done. All national leaders profess to realize that their value can be dangerously depreciated by promising too much, legislating too much, or simply talking too much. The commonplace truth, however, is often forgotten. Senator Hubert Humphrey's chronic failing was noted some years ago by Adlai Stevenson, who characterized him as "a politician with more solutions than there are problems."

Rather unexpectedly, after defeating Humphrey in 1968, President Richard Nixon has shown a similar fondness for hyperbole. His 1971 State of the Union message hailed his proposals for federal reorganization as a "New American Revolution," and he saluted the return of our astronauts from their moon flight as providing mankind with "the greatest week in the history of the world since the Creation."

By way of contrast, two Presidents as dissimilar as Eisenhower and Kennedy shared a common capacity to shun extravagance in explaining their acts, whether in political campaigns or press conferences.

The Presidential loss of a sense of proportion has marked, in fact, at least three of the least happy moments known in the White House in the 20th century—all afflicting, strangely, three of its most skillful politicians. Woodrow Wilson, with headlong evangelism, hailed the Treaty of Versailles as leading to "the pure light of the justice of God." This attitude, with his disdain for any impure bargains with Senate leaders, brought on the tragedy of his last Presidential months. Franklin Roosevelt—of all canny Presidents—was so intoxicated by his landslide victory of 1936 that he sent to Capitol Hill his snarled scheme for "packing" the Supreme Court, without bothering even to inform his Cabinet until his message was written and dispatched. Lyndon Johnson's near-defiance of all sense of proportion led him to compare the support of Saigon with the saving of West Berlin or to equate the values and the purposes of the Vietnam War with World War II.

A sense of drama. For all its many expressions and opportunities, this Presidential art, not always but most often, entails a spirit of combativeness, of being as ready to join a conflict as to announce a consensus. As James Madison urged, with respect to the separation of powers, "Ambition must be made to counteract ambition." It has ever since been thus, especially between executive and legislative branches. "I've always said," Harry S Truman said again in 1954, "that the President who didn't have a fight with the Congress wasn't any good anyhow."

"Dull government can only endure," Harold Laski wrote a generation ago, "when government is unim-

In *Punch,* timing-conscious Lincoln plays a card, emancipation, to dash South's hope for recognition.

portant"—that is, during a Coolidge era when enough of the citizenry could believe that "dullness is the same as soundness." But a truly *important* Presidency has never failed to raise the noise and dust of combat.

There could be no more true measure of the distance between the Republican Presidencies of Theodore Roosevelt and Dwight Eisenhower than this: As TR rejoiced in the office as the "bully pulpit" from which he could preach and yell, Eisenhower found no national leaders more repugnant than those whom he decried as the "desk pounders," always ready to exhort or to excoriate. Among Democratic Presidents, at least in modern times, the appreciation of the uses of confrontation has been much more keen. Woodrow Wilson revived the custom of Presidential appearances before Congress, which had lapsed since Jefferson's time, and as one historian has noted: "He literally dramatized the Presidential message to Congress."

Truman's "do-nothing" Congress

Franklin Roosevelt named and mocked his chosen enemies as "economic royalists," and while he assailed them, he retained them like a band of unemployed actors—all cast in the drama of his duel between Wall Street and Pennsylvania Avenue. Harry Truman fought toward his improbable victory in the 1948 Presidential campaign by taking on the role of public prosecutor of "the do-nothing 80th Congress." An editor who interviewed him, on the eve of that campaign, reported: "I had never before seen such an example of faith, serenity, and atomic belligerency in any one human being." Precisely these qualities have assured the citizenry, over the decades, that their Presidency was alive and well in Washington.

A sense of timing. Without some sure instinct for pace and rhythm, even the Presidents most gifted in dramatics would soon enough become but national bores. There have been modern Presidents—most notably, the two Roosevelts—with an unusually shrewd sense of when to thrust and when to parry. But none has surpassed Abraham Lincoln in this most subtle and often decisive political intuition.

Classic proof of Lincoln's art came, slowly and deliberately, with the Emancipation Proclamation. For month after month following his election and the South's secession, Lincoln had been forced to weigh no less than four unsettling but related factors: his own attainment of the Presidency with less than 40 percent of the popular vote, his need to keep the slaveholding border states loyal to the Union, the threat of English recognition of the Confederacy, the lack of an auspicious military moment for making any audacious political move. Through this painful interim—until after the Battle of Antietam—Lincoln resolutely deferred action. He explained to a friend: "I can see emancipation coming; whoever can wait for it will see it; whoever stands in its way will be run over." Meanwhile he exasperated the zealots who besieged him, including one delegation of church leaders whom he failed to pacify with the wry warning that a premature proclamation might be as meaningless as the Pope's bull against the comet. He did not tell them that the draft of their longed-for statement already had been written and rested on his desk.

Photographed just before his assassination, Lincoln shows his plainness, humor and compassion.

By the time of the Proclamation's final release, in September of 1862, Lincoln had gained not only such goals as keeping the border states from rebellion and rallying British opinion to the cause of antislavery; in the words of historians some generations later, he also had "lifted the civil war to the dignity of a crusade." He had known, in short, how to wait. And the

example would instruct any future President on how best, at certain times, to lead.

A sense of humanity. All the stories, like all the styles of the Presidents, seem to argue that no artfulness of strategy can prevail over a chillness of spirit. When Lincoln had to try to heal the first great schism in the Republic's history, he warned—in the last speech of his life—against any divisive reconstruction policy inspired by "a merely pernicious abstraction." When Hoover faced the second great schism, however, he imagined that it could be papered over with the abstraction of his own economic theory. And after this President had dismissed the Bonus Army's march on Washington as essentially the work of Communists and hoodlums, novelist Sherwood Anderson wrote an open letter that could be addressed, under any date, to any White House closed against dissent: "I am wondering, Mr. President, if men like you, men now high in our public life, captains of industry, financiers—the kind of men who seem always to be closest now to our public men—I am wondering if all of you are not nowadays too much separated from the actuality of life. Everything has been very highly organized and centralized in America. Perhaps you have been organized and centralized out of our common lives."

A polemic from an anguished time, this may have been unfair, as it surely was bitter. Yet it warned realistically of the price paid by any Presidency that even gives the appearance of comprehending—or caring—not quite enough. The radically different kind of communion possible between President and people had been perceived long ago by James Russell Lowell, in his essay on Lincoln: "No higher compliment was ever paid to a nation than the simple confidence, the fireside plainness with which Mr. Lincoln always addresses himself to the reason of the American people. . . . He never appeals to any vulgar sentiment, he never alludes to the humbleness of his origin; it probably never occurred to him, indeed, that there was anything higher to start from than manhood; and he put himself on a level with those he addressed, not by going down to them, but only by taking it for granted that they had brains and would come up to a common ground of reason. . . .

"Homely, dispassionate, showing all the rough-edged process of his thought . . . with an honest kind of every-day logic, he is so eminently our representative man, that, when he speaks, it seems as if the people were listening to their own thinking aloud."

A sense of creativity. It is one final, "peculiar" but

LBJ eventually preferred the life on his ranch to the miseries of the Oval Office. He suffered from misjudging Vietnam War.

persistent mark of almost any President that the vigor of his action has borne virtually no relation to the size of his mandate. There have been few more convincing calls to the White House in the 20th century than those that summoned Warren Harding in 1920 and Dwight Eisenhower in 1952. Yet the two men may be said to have left either their country or their party roughly where they first found them: untroubled, uncontrite and unchanged. Also in this century there were few more narrow Presidential victories than those of Wilson and Truman. Yet both affected the country so profoundly as to forbid a return to the past.

Throughout our history there appears to be only one fairly consistent mark of all the more progressive —and aggressive—Presidents: a willingness to forget or ignore most of what came before, be it the Republic's apparent sentiment or the candidate's avowed commitment. Thomas Jefferson, who had preached Constitutional purity, became the President who pressed the Louisiana Purchase, lawful or not. James Polk, a man with no fame for visionary statecraft, stubbornly pushed the nation's frontiers through Texas, California and Oregon. Abraham Lincoln, Whig Congressman who had deplored the warmaking presumptions of Polk and exalted the lawmaking privileges of Congress, became the President who would not wait for Congress to summon the militia, suspend habeas corpus, proclaim a blockade, commit unappropriated money and recognize a state of civil war.

Almost a century later, the Democratic Senator from Missouri, Harry S Truman, who seemed almost to stumble into the White House in 1945, would stand tall enough to preside over the Marshall Plan in Europe, the birth of the United Nations, the defense of Greece and Turkey, the shielding of West Berlin and the war for South Korea.

The sum of all six senses of style might be called a sense of history. Nor would this be as vague as it first might sound. A less common definition of *style* is "gnomon," the part of a sundial which "projects a shadow used as an indicator." It tells time.

The metaphor fits. The Presidency, too, depends on and responds to the political climate around it, projecting and indicating, marking and measuring all the surrounding atmosphere. If the President is a national leader, purposeful and persuasive, he catches the strongest light about him, so that witnesses of even dim vision can see it. He thereby allows people to perceive the true time it is in the history of the nation. And he then becomes the style of the Republic.

"The greatest week in the history of the world," is a Nixon overstatement as he greets quarantined Apollo 11 astronauts Armstrong, Collins, Aldrin.

Double feature for National Zoo

Twin orangutans, rare in captivity, get special treatment in Washington—including formulas, bottles and baby food

Don't try to tell these babies apart. Even Judy Block at the Smithsonian's National Zoological Park in Washington, D.C., has trouble doing that, and she's raised them almost since they were born last December 27—the third time ever that twin orangutans have made it into the world in captivity.

The Ambassador from Indonesia, home of wild orangutans, named these little females Mawar (Rose) and Melati (Jasmine). In the wild, orangutans are dwindling, though at last they have some protection. So far no captive-born pair has produced young. Jennie and Archie, the twins' parents, were born wild. Jennie has given birth to three other babies before these. Whether or not Mawar and Melati will ever have young of their own remains to be seen.

Just the process of their growing up is enough to keep the National Zoo's intensive-care unit busy.

Smithsonian acquisition

Judy Block, chief of the zoo's special care unit, holds five-week-old Mawar—or is it Melati?

Melati—or perhaps it's Mawar—peers over the edge of a scale. Both were about 3¼ pounds at birth.

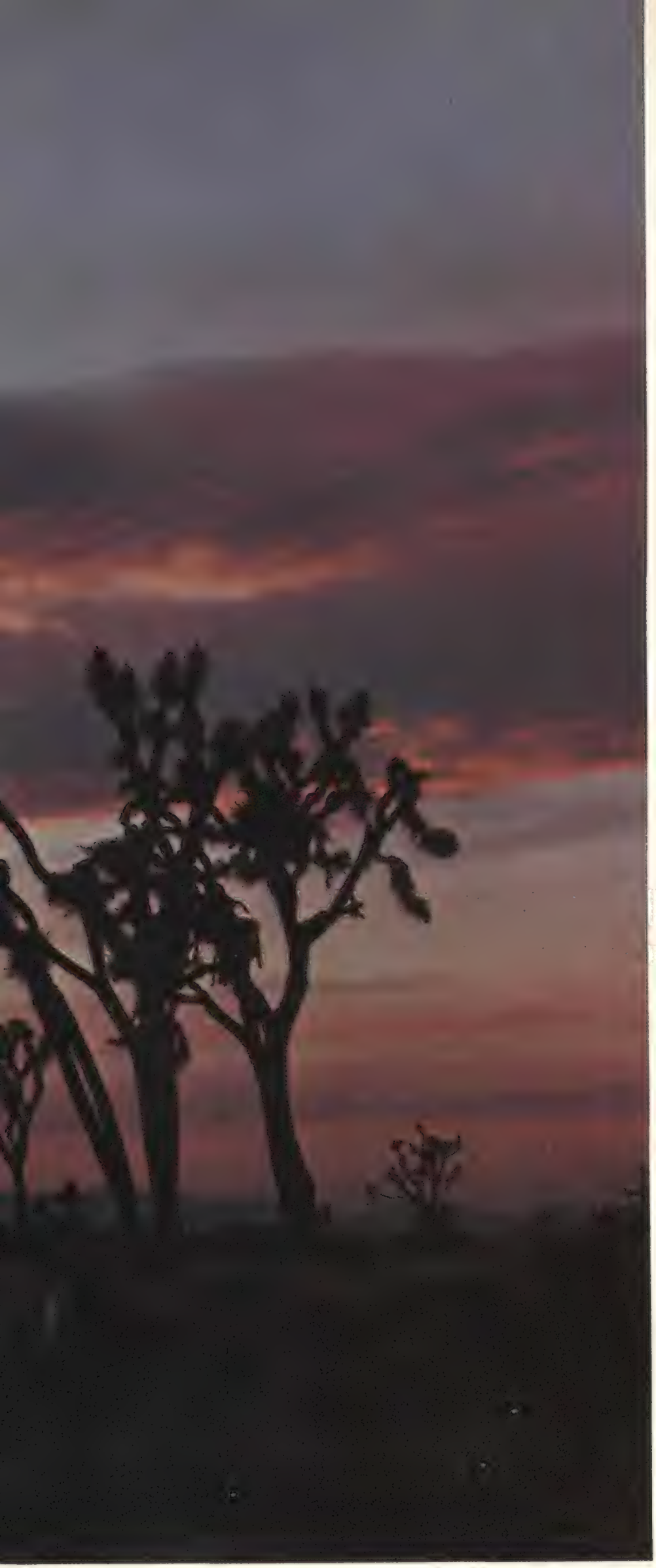
Jennie is dry of milk, so the girls will spend the first seven months of their lives in the unit. They started on a demand feeding schedule, then eased on to a regular one of alarming frequency. Since cow's milk has given diarrhea to other baby orangutans, these have been fed with a soybean-based formula (also used for human infants with certain allergies). Judy Block supplements this with baby food—just plain old baby food from the local market.

Mawar and Melati are being reared as zoo animals, not as pets, so must get used to being left alone by their human guardians. Yet they instinctively seek the sort of treatment that a wild orangutan would expect —lots of contact with a mother, lots of swinging along on her back, high in the treetops. Mawar and Melati love to be rocked, and they hang on to a handy finger with a grip like iron.

The most characteristic plant of the highlands of the Mojave Desert, Joshua trees (*Yucca brevifolia*) are silhouetted by a March sunset.

The improbable wild gardens of our deserts

Oversized upland oddities, intimate lowland annuals and spectacular cacti—each has developed its own strategy, its own timing



Photographs by Roland and Karen Muschenetz

A month later, in April, a cluster of waxy flowers emerges from the branch tip of the Joshua tree, a member of the lily family.

Legend has it that towards the end of his life, W. C. Fields came across a flower blooming in the desert. Captivated, he called his agent in Los Angeles and demanded that he join Fields to see "something truly remarkable." The next day the agent arrived, tired and dusty from his drive of several hundred miles and the two men set off on foot. When they arrived at the site they found only the plant—there was no flower. Whereupon Fields, it is said, thrashed the naked plant with his cane, bellowing: "Bloom, damn you, bloom!"

In the business of being a desert flower, as in comedy and other exacting trades, a critical element is timing. When, for example, does spring come to the desert?

Another newcomer to the desert (who was more sympathetic though no less bedazzled than W. C. Fields) spent a considerable amount of time trying to determine when this natural rite occurred. Of course, Joseph Wood Krutch was accustomed to the more synchronous flush of life that ends the obvious winters of New England. But on the Sonoran Desert, which reaches up from Mexico into southern Arizona and California, Krutch could not readily identify any real winter. There was no month when flowers did not bloom somewhere in the desert, so spring was a somewhat confusing matter.

Each plant species apparently has its own spring and some have more than one a year. Take the ocotillo, a plant that for Krutch best expressed "the spirit of the Sonoran Desert—one which combines oddness of form and habit with the courage to flourish under seemingly impossible conditions, and which combines also the defensive fierceness of thorns with the spectacular, unexpected beauty of brilliant flowers. . . ."

A botanical freak, the ocotillo is the only representative of its genus and family in the United States. Found on rocky hillsides, its cluster of thorny, unbranched stems can reach as high as 12 to 15 feet, swaying like hard, woody coachwhips in the hot wind. Yet a substantial rain at nearly any time of the year brings forth a mantle of hundreds of tiny leaves up and down the length of the ocotillo's stems. Then after a few days or weeks, when the soil's moisture is again low, the leaves turn brown and fall off, and the dead-looking stems wait for another rain. In the course of a year the ocotillo experiences several springs and autumns.

"Nevertheless," as Krutch wrote in *The Desert Year*, "it knows somehow when the one authentic spring has come. . . ." Sometime in April or May, regardless of

Glowing in the late afternoon sun, this habitué of the high country, the century plant (*Agave deserti*), waits for up to 15 years before it blooms.

whether the plant is clothed in leaves or not, a cluster of buds emerges at the tip of almost every stem and bursts into a cone of brilliant red flowers. The slopes are then lit with what seem to be the flames of hundreds of candles.

It did not take long for Krutch, like many others before and after him, to recognize that the timing of the flowers depended on exactly where on the desert he might be standing. For the observer, spring is a matter of choice; for the plant it is a rigorous set of conditions that may or may not be met. In April, on a sandy wash it might already be summer while down on the edge of a canyon pool there are emergent signs of spring recognizable even by a New Englander. At the same time, a few thousand feet up, snow still blankets a mountaintop.

"Many a plant, bird and animal," wrote Krutch, "sticks almost as closely to his altitude belt as though he were on an island surrounded by water instead of merely in an environment determined by his height above sea level."

The ocotillo, with its several springs, is a creature of the high rocky slopes of eroding mountains. It is restricted to altitudes below 5,000 feet, but it has the "courage" to extend northward out of the Sonoran Desert, with its characteristic assemblage of cacti, and thereby it botches up the neat categories of the botanists. The ocotillo's northern limits are in another desert, the Mojave, a place characterized not by the cactus but by the lily—specifically a 20-to-30-foot member of the lily family known as a tree yucca.

After April rains, annuals sprinkle lowland slopes: Tidytips bloom among the yellow golden fields and purple Mojave owl's clover.

Yuccas and the century plant

Spring does not necessarily come every year for the tree yucca—or Joshua tree as it is called because Mormons saw in its raised branches the supplicant arms of Joshua (see pp. 40-41). On high desert ranges and around their bases, in areas of eight to ten inches of rainfall a year, the Joshua tree is often found growing out of a carpet of the fragrant and nearly ubiquitous creosote bush. It spreads its small roots downward and horizontally, not only securing moisture but anchoring the plant against desert gales.

Sometime between February and April, tight clusters of greenish-white buds emerge from the ends of the tree's outstretched branches. But if, in this period, moisture and temperature conditions are not right, the Joshua tree simply forgoes blooming and waits for another more propitious year.

Less fussy about territory and climate is the tree yucca's relative, the Spanish dagger, a bizarre collection of yellow-green leaves that point menacingly upward and outward. From the center of these bayonets a long stalk emerges that can reach as high as ten feet.

Desert mallow (*Sphaeralcea ambigua*), common throughout the desert lowlands and washes, is known as a "very bad plant" by the Mexicans.

Found throughout the semiarid coastal counties of California, this yucca reaches its perfection in height and concentration in the Mojave and extends eastward to the Colorado Desert in Utah. Sometime in midsummer, depending on location, the long stalks bear huge clusters of waxy, bell-like flowers, and wherever you see Spanish dagger flowers you are almost certain to see a *Pronuba* moth, since neither could survive without the other.

Shortly after the yucca plants bloom, the moth arrives and, in the process of entering a flower, pollinates it. In return, the yucca gives up some of its own treasures. The moth lays its eggs in the flower's ovary and, as they grow, the larvae feed on the seeds, restraining themselves sufficiently so that the wind can scatter enough yucca seeds about the desert to insure the existence of the next generation.

Another plant of the high desert country, and one which neophytes sometime confuse with yuccas, is the desert agave (see page 42).

For most of its life the agave exists as an undistinguished clump of succulent leaves; after some 15 years it will have stored up the necessary nutrients for its single, splendid performance. Within a matter of weeks, a plumelike flower stalk emerges and reaches as high as 25 feet. If the young stalk is cut, its sap can be extracted and distilled to make tequila. If left alone, the agave in California produces spectacular yellow flowers, usually in May. Later, after the fruit ripens, the plant dies. The long preblossom period of 15 years has given rise to the somewhat exaggerated common name, century plant.

It is such melodramatic freaks, with their unlikely rhythms and their improbable bursts of flowers, that give the high desert its unforgettable and austere beauty. Elsewhere, at lower elevations, the floral array is of a different character. Low-growing plants are

Thick patches of purple sand verbena flowers (*Abronia villosa*) spread across the sandy flats in April and may bloom again in September.

Closing time: The early morning sun reaches the delicate petals of the dune primrose (*Oenothera deltoides*), which blooms at night.

sprinkled across the sandy flats and washes; they seem more intimate in scale, more ordinary, till you realize that their habitat is the desert at its least hospitable.

In March and April (and again in September) sand verbena lines roadsides and carpets the dunes and dry stream beds with purple flowers. You are likely to come across an herb, desert mallow (see page 43), bearing small flowers the color of grenadine—known locally as sore-eye poppies since the little hairs on these plants are considered irritating to the eyes. *Plantas muy malas,* say the Mexicans: very bad plants.

Also clinging close to the desert sands are mats of white flowers with yellow centers—the Mojave desert star. After a brief rain, low hillsides that the day before were barren and dusty will be miraculously peppered with the blue, white and yellow flowers of lupine and poppy.

Many of the low-lying plants are annuals: Instead of waiting out the long dry periods by lapsing into dormancy (like the ocotillo), they escape the severe heat and drought of the desert floor by growing quickly, flowering immediately and briefly and then dying. For example, on the hot sandy flats you may come across small mats of a flower called, appropriately, purple mat. If it has been a particularly dry season, however, the purple mat forgets its name and saves itself by hurrying to maturity, producing few leaves and often only one flower.

Perhaps the best known of the more humble desert flowers are the 20-odd species of primroses which ob-

stinately bloom only at night, withering in the early morning sun. One of these, the dune primrose (see page 45), plays host to a particular moth as does the Spanish dagger yucca. In this case it is not a harmonious relationship: The sphinx moth often destroys the dune primrose—both plant and flower. Some dune primroses are saved, however, by the crab spiders which hide, camouflaged, in the whitish petals and pounce on the immoderate moths.

Not all lowland plants stay close to the ground. Another inhabitant of the sandy washes, where the runoff of summer and winter rains provides sufficient if occasional moisture, is a shrub that looks from a distance like a low-lying cloud of gray smoke. Indeed, it is called the smoke tree, and its other common name, the indigo bush, derives from its violet-blue flowers that bloom in May or June.

Yet as noteworthy as all of these desert plants are, as glorious or surprising as their flowering may be, nothing so specifically signifies "desert" for most people as a cactus. Cacti deal with their environment directly and boldly, in true frontier spirit.

Rather than evade drought by lapsing into dormancy or by means of a foreshortened life, the cacti simply store up enough water to last them through the long, dry periods. And this, of course, means that cacti cannot survive in the driest part of the desert. They require seasonally plentiful moisture and thus are found on higher ground, where gravelly soil and crevices in the rock permit summer cloudbursts and winter rains to percolate down to their roots.

Few cacti at all are found in the Mojave Desert. Indeed, just as the Joshua tree is what the botanists call an indicator species, its range delineating that of the Mojave itself, the giant saguaro cactus is the indicator of the Sonoran Desert to the south. Growing up to 50 feet tall and 12 tons in weight, the saguaro can absorb as much as a ton of water from one rainfall (and like so many of the world's largest creatures—for example, redwoods and whales—the saguaro is endangered). The quintessence of "desert" for generations of postcard-senders, the saguaro is a stately plant; most of its relatives look awkward, clumsy, even slightly ridiculous, like the prickly pear. Up close, they all look dangerous. Perhaps it is because they spring from such unprepossessing origins that many people seem to think cactus flowers the desert's most beautiful.

Long after Joseph Wood Krutch had become a desert habitué, another easterner (from, of all places, the waterfront of Hoboken, New Jersey) arrived in the desert and considered the cactus flowers' generally accepted reputation.

"Merely opinion, of course," wrote Edward Abbey in *Desert Solitaire,* "but the various cactus flowers have earned the distinction claimed for them on the basis of their large size, their delicacy, their brilliance and their transience—they bloom, many of them, for one day only in each year. Is that a fair criterion of beauty? I don't know. For myself I hold no preference among flowers, so long as they are wild, free, spontaneous. (Bricks to all greenhouses! Black thumb and cutworm to the potted plant!)"

A brilliant crown of March flowers decorates the thorny-fruited cactus (*Opuntia echinocarpa*).

Sun lights thorny-fruited cacti, chollas (center, *Opuntia Bigelovii*) and monkey flowers (*Mimulus*).

Eiffel Tower's mighty piers straddle almost four acres on the park, Champ de Mars.

By Joseph Barry

Eiffel, versatile engineer-builder of towering talents

A genius with wrought iron, he spanned 1,000 feet of Paris, straight up, in a great and once controversial landmark

Alexandre Gustave Eiffel, engineer, builder and visionary *extraordinaire* in middle age.

"We come, we writers, painters, sculptors, architects, passionate amateurs of the beauty unviolated until now in Paris, to protest with all our might, with all our indignation, in the name of unrecognized French taste, in the name of menaced French art and history, against the erection in the heart of our capital, of the useless and monstrous Eiffel Tower. . . ."

The above letter, published on February 14, 1887, was signed by painter Jean Louis Ernest Meissonier, Charles Gounod, composer of *Faust,* Charles Garnier, architect of the Paris Opéra, novelist Guy de Maupassant and twoscore others.

"No one has yet seen it," protested engineer Gustave Eiffel. And in truth, ground had barely been broken for his tower. Nevertheless, this writer would have signed the esthetes' manifesto, just as, 20 years ago, I dismissed the iron "monster" as having "no more to do with the Paris skyline than a captive balloon."

Since then, I have moved close to the 1,000-foot tower, and have been converted—as eventually were the writers, artists and amateurs of beauty inviolate of Eiffel's time, save Maupassant. He used to lunch in one of the tower's four restaurants, he reputedly said, because it was the only place in Paris where he couldn't "see the blasted thing."

From afar it's a tourist souvenir, a male symbol. Approached, it becomes feminine, comfortingly maternal, the finest piece of metal sculpture I know. It is a bridge flung to the sky. Its exposed structure allows one to picture its creation, invites one to clamber and explore its heroic, yet lacelike members. This is festival architecture—a happy work of art. It is the product of a happy life—though a life remarkably unknown by the public.

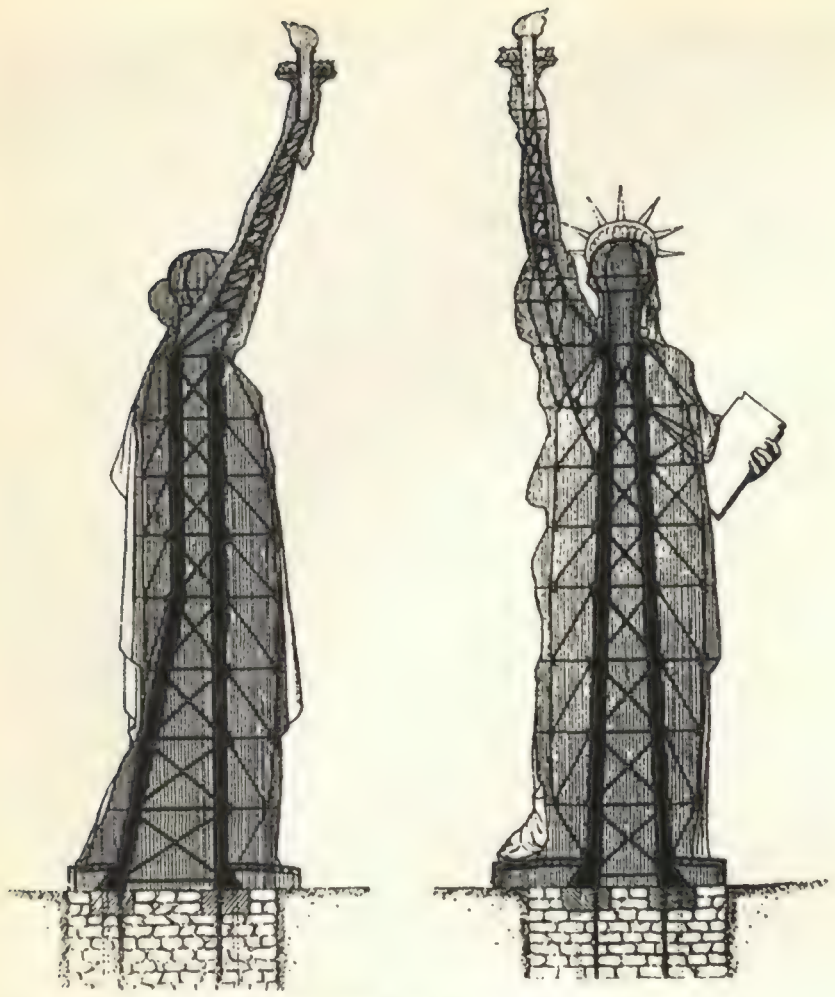
"I should be jealous of the tower," Eiffel once wistfully said. "The world thinks it is my only work. But I have done other things too, after all." Indeed, Alexandre Gustave Eiffel was a truly significant figure: a transitional designer between stone and steel, constructor of the first practical wind tunnel, pioneer designer of the huge sluices of the Panama Canal, builder of metal bridges.

He was born in Dijon in 1832 of a prosperous family. Of Rhineland origin, its name was Boenickhausen, but Paris was never really threatened with a Boenickhausen Tower. Since living in France, Gustave's family had called itself Eiffel—another Rhenish name, but easier for the French to pronounce.

Gustave's was a cloudless childhood. Though not a particularly apt student ("he improved with his professors," says his 82-year-old grandson somewhat defensively), he was spanked with love.

"From my father," Eiffel himself used to say, "I inherited a taste for adventure, from my mother a love of work and responsibility." *Papa* had soldiered under Napoleon, *Maman* had run the family's prosperous

Joseph Barry has written SMITHSONIAN *articles on the Paris Commune (March 1971), Coco Chanel (May 1971) and Vaudreuil (July 1971).*



Eiffel's interior bracing for Frédéric Bartholdi's Statue of Liberty entailed an iron skeleton. The 225-ton figure has stood firm for 86 years.

coal-and-iron business. Gustave failed the oral examination for the prestigious French school of engineering, the Ecole Polytechnique. Instead he studied at the more practical Ecole Centrale des Arts et Manufactures and graduated (to please his family) as a *chemical* engineer, though his true interest was soon to become civil engineering.

He wangled a beginning job with a railroad company run by Charles Nepveu, where he learned metallurgy. In a few years he was in charge of the "planning division," and, at 26, he was directing the construction of a major railway bridge crossing the Gironde River at Bordeaux. He employed newly devised caissons and used compressed air for excavating the foundations.

"You must remember," says grandson Le Grain-Eiffel, a retired automotive engineer, "that at that time tools were largely the pick, the shovel and the cart. My grandfather's first trip to Paris at 12 was in a *diligence.* Railroads were just being built."

While bridging the Gironde, one of Eiffel's workmen fell into the water. Dapperly dressed as usual, Eiffel put aside his redingote, took off his shoes, dived in after him and pulled him out. As a student he had won a bet by swimming the length of Paris at night in the Seine. (Though small—about five feet, five inches—Eiffel was very *sportif.)* He put his shoes back on and resumed his coat. "Be good enough," he told the clustering workers, "to stick to your scaffolds from now on. I like to swim, but not with my clothes on." After the Bordeaux bridge was finished, his men had a medal struck in commemoration and presented it to him.

Nepveu's railroad construction company did not fare very well, and Eiffel decided to go out on his own. Carefully his mother *advanced* the necessary money ("she did not want to disadvantage her other children," says his grandson). Gustave repaid it soon enough. The firm of "G. Eiffel, Builder and Construction Engineer," did remarkably well. It built factories, churches, breakwaters, a synagogue, two great viaducts between Gannat and Commentery, numerous railroad bridges between Poitiers and Limoges (the tapering iron pylons of the Sioule Bridge foreshadow the Eiffel Tower). Commissions came from Switzerland, Russia, Spain, Austria-Hungary, Egypt, Peru, the Philippines.

The greatest challenge came from Portugal in 1877, following an international competition. The railway approaching Porta from Lisbon required a bridge across the Douro River, 200 feet below in a gorge, in a single span of 525 feet. Eiffel's winning solution was to hang each half of the main arch from steel cables anchored on each bank. Slowly the halves were built up from both sides until they met. The construction technique was by suspension, though the Maria Pia Bridge itself was arch-supported. Similarly the great Garabit Viaduct—Eiffel's favorite—was swiftly built. Its braced-iron piers rose 300 feet.

Early in his career Eiffel was approached by his friend, sculptor Frédéric Auguste Bartholdi, on behalf

Eiffel's bridge-building technique, as illustrated here at the Douro River, Portugal, was to suspend

of his Statue of Liberty for the United States. Bartholdi had run into a stumbling block: how to support his giant statue made of copper sheets, so it would stand up permanently. Eiffel's solution was an interior, wrought-iron framework similar to the steel framing now at the core of so many great city buildings.

A mark of Eiffel's engineering genius—possibly of all genius—was that he sought solutions by simplification. Thus he employed the technique of standardizing and prefabricating bridge parts. It was particularly useful for construction in countries where workshops and skilled workmen were at a minimum and their transplanting prohibitively costly. At the request of the Bolivian government, Eiffel devised a bridge whose prefabricated elements, limited to a weight of 150 pounds per item, could be carried to their eventual site on the back of a llama. From Cochin China to Szeged, Hungary, Eiffel became known as the man who sold bridges "by the kilo and the meter." He was "the magician of wrought iron."

He kept his humility—and humanity. When he published accounts of his projects, he listed all his collaborators, office boys included.

On both sides of the Atlantic the idea of a 1,000-foot tower was tantalizingly in the air. It was proposed as the symbolic peak of a century of progress for the Philadelphia Centennial Exposition of 1876, but it was never built. In France the idea coincided with plans for the Paris Exposition of 1889, which would simultaneously celebrate republican respectability on the 100th anniversary of the Revolution of 1789 and French recovery from the defeat by Prussia in 1870-71.

the growing halves of the arch from anchored cables until the span was joined in the middle.

Shortly before Mme. Eiffel died in 1877, they appeared with their children. She was 12 years his junior. After 15 happy years with her, Eiffel never remarried.

Eiffel was approached by two engineers of his company, Emile Nougier and Maurice Koechlin, with a tower project. The proposal was the logical consequence of Eiffel's work on the supporting piers of the Sioule and Garabit bridges. Eiffel presented the idea to the ministry concerned with the Paris Exposition. Competition was opened, 700 projects were submitted, but Eiffel won handily!

He would build his tower, he said, with iron, "though steel is the metal of the future," because "I have worked with wrought iron all my life." The French government accorded one-fifth of the estimated cost of some seven million francs. Gustave Eiffel mortgaged his company for the rest and assumed personal responsibility when residents near the Champ de Mars building site threatened suit should his tower fall on top of them.

In January 1887, after 18 months of planning by 30 engineers and draftsmen under Eiffel's direction, the first shovelful of dirt was ceremonially turned over. Within 14 months the foundations had been dug and emplaced, the four great iron-braced, inward-inclining piers, encompassing an area of nearly four acres, had been erected, section by section, and the tower's first platform, 57 meters, or 187 feet, above the ground, was riveted and bolted to them. Arches were added below the platform for decorative and psychological effect—an *illusion* of support.

Eiffel's suburban plants prefabricated 12,000 sections and perforated them for 2,500,000 rivets. Tolerances were extremely low and not a file, we are told, was needed on the site. As the tower rose, a canteen

was organized for the 250 workers, so they would not have to descend for lunch. Not a life was lost, save that of a young workman who, showing off for his fiancée on a girder after hours, slipped and fell to the ground.

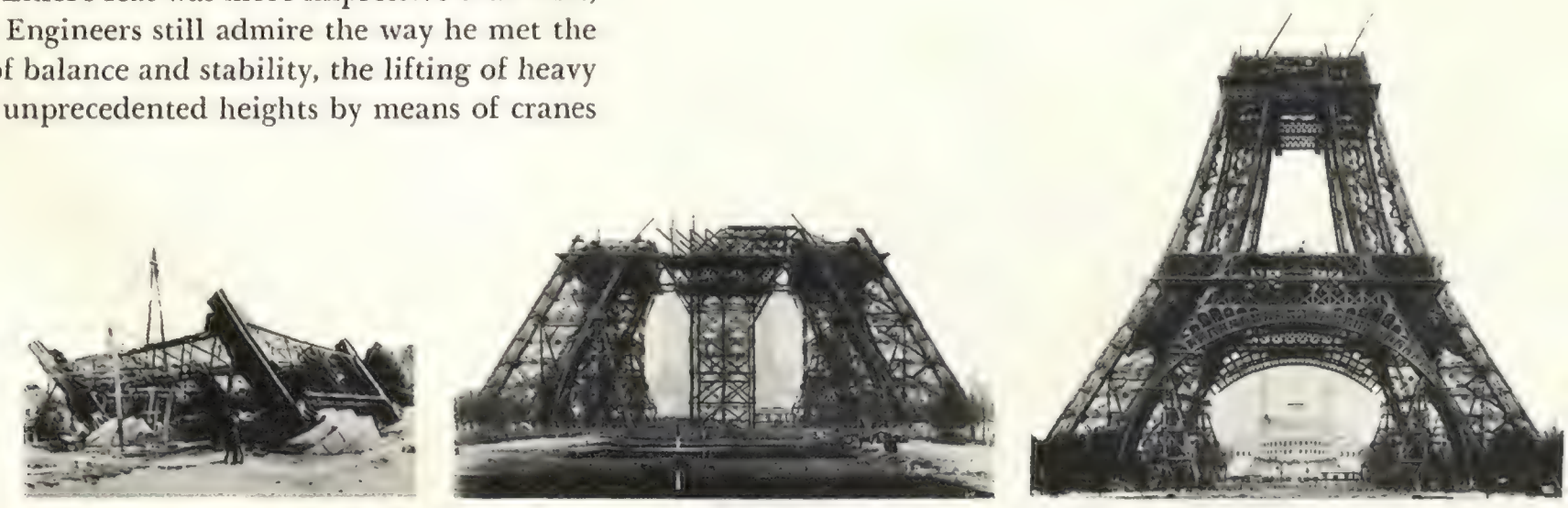
With the first platform the worst was over. The rest of the tower, though it had some 250 meters to go, was comparatively simple. By July 1888 the second platform was in place and Eiffel provided Paris with fireworks from it on the eve of Bastille Day. By the time the French Exposition opened in May 1889, the third platform was riding the Paris sky, and the tower itself was ready. Initially it was 300.65 meters in height. Now, with its television antenna, it totals 320.755 meters, or 1,052 feet.

On its inauguration day, however, the elevators (some of which are still venerably functioning) were not ready, and 56-year-old Eiffel, fit as a teen-ager, led the nation's elders up the 1,710 stairs. Many stopped at the first platform, only about half, including one lady, made it to the third. Here a very moved Eiffel hoisted the French flag, having given France, he said, the world's tallest flagpole.

Gustave Eiffel's feat was more impressive than that, to be sure. Engineers still admire the way he met the problems of balance and stability, the lifting of heavy weights to unprecedented heights by means of cranes that rose from the structure, the calculations for wind resistance (remarkably comparable to those for the 100-story John Hancock Center in Chicago). The *lightness* of Eiffel's tower is indicated by this intriguing statistic: The *air* in a 300-meter-high cylinder with the circumference of the tower's base—a cylinder just large enough to contain the tower—would weigh more than the *iron* used in the tower itself, that is, in round figures, 9,000 tons of air as compared to 7,000 tons of iron.

Within months of the tower's completion almost two million Paris Exposition visitors had paid five francs apiece to ascend it, virtually wiping out Eiffel's debt. Possibly Thomas Edison did not pay the full amount to go all the way to the top on September 10, 1889 (it is now eight francs). But there is a wax cylinder phonograph Edison presented to Eiffel, which is preserved among the period furniture of the latter's private little apartment, beside the top observation platform and overlooking Paris like an eagle's nest. And there is the record of Edison's sentiments in the words he wrote in the "Golden Book" of the tower: "To M. Eiffel the Engineer, the brave builder of so gigantic and original a specimen of modern engineering from one who has the greatest respect and admiration for all Engineers, including the Great Engineer the Bon Dieu."

To bring the record up to date, the city of Paris has owned the Eiffel Tower since 1909. In 1970 there were 2,757,768 paying visitors, making this the most visited monument of France, if not of the Continent. As for Gustave Eiffel, he became involved in the ill-fated Panama Canal Company of de Lesseps, as engineer and designer of a lock system. The company was found guilty of financial malpractice, but Eiffel was completely cleared. In 1894, at 61, he "formally retired." Transforming the salon of his tower apartment into



Progress report in pictures: from the left, the tower in mid-1887, in early 1888, in late summer, 1888, in November 1888, in early 1889 and upon its completion, in the spring of 1889.

a meteorological laboratory, he began a study of weather and soon launched an attack on his "old enemy," the wind, which had for him the fascination of the sea for the sailor. Dropping objects from the tower's second platform, he traced the pattern of their fall according to their shapes and forms. Dissatisfied with his haphazard findings, he designed the world's first *usable* wind tunnel at the foot of the tower, then a considerably larger one at Auteuil.

Aerodynamics became Eiffel's passion. He examined wind pressures on building models, air resistance in the design of airplane wings and propellers. He published his results, aiding designers and civil engineers everywhere and contributing eventually to such World War I planes as the Bréguet and the Spad. At the age of 80, on May 6, 1913, Gustave Eiffel was awarded the Langley Medal for aerodynamics by the Smithsonian Institution. He shared the honor that year with Glenn Curtiss, famed aviation pioneer. Their medals were the second and third in the Smithsonian's history; the first had gone to the Wright brothers in 1910—seven years after their momentous flight at Kitty Hawk.

Alexander Graham Bell made the presentation in Washington, D.C., to the French ambassador, for Eiffel was not present. "The eminent engineer, builder of the Eiffel Tower," said the inventor of the telephone, "despite his eighty years, continues his studies in his chosen field with the enthusiasm of youth, and his works on wind resistance are already classics. . . . They have furnished engineers with the data for the design and building of flying machines on the basis of solid, scientific principles."

Even Eiffel began to slow down in his ninth decade, spending his evenings at home instead of at his wind tunnel. He devoted weekends in the country to his family, particularly his grandchildren, who always celebrated his birthday by playing the piano, reciting a Greek poem, presenting him with a sketch, a design, even a scholarly paper. "That way," said their grandfather, "I can see how you are progressing."

Until quite late in life, Gustave Eiffel gave his grandsons fencing lessons and in his 80s delighted in an early automobile. In his 91st year he completed a history of the family. In December 1923, he died peacefully.

It's a sperm whale, it's superbean!

An Indian handles jojoba seeds, potentially the source of a valuable industrial lubricating oil.

The waxy seeds of a wild desert plant may fill industry's requirements for sperm oil and provide the Indians with a cash crop

The sperm whale may be saved from extinction not just by conservation laws, but by the Indians of the Southwest, good business practices and a wild-growing bush that produces a dark fruitlike seed about the size of a peanut.

In 1970 the sperm whale was placed on the U.S. list of endangered species. As of the first of this year, American whalers may no longer hunt this commercially important species or any but one of the other ten species of great whales. But there are other nations engaged in whaling, nations which are less concerned with the conservation of whales. So sperm whales will continue to be hunted down—and there is a good reason for it. They contain a unique liquid wax called sperm oil.

Sperm oil is of critical importance in operating machinery at high speed and temperature. It is essential in automobile transmission lubricants, in breaking in engines, making machine tools and rifling guns. So valuable is this liquid wax that it has been stockpiled by the U.S. Office of Emergency Preparedness. With one or two exceptions, the importing of sperm oil to the United States is no longer permitted.

But no economically viable substitute—natural or synthetic with the unique qualities of sperm oil has been found. What then will become of industries relying on it? And what will become of sperm whales, still hunted by other whaling nations? The answer may lie in the Sonoran Desert of the American Southwest.

What may now prove to be a natural substitute grows in abundance on 100,000 arid square miles in Mexico, Arizona and California. It is a drought-resistant shrub called jojoba, or *Simmondsia chinensis,* and its seeds contain a liquid wax remarkably similar in chemical properties to sperm oil. It also holds out promise of being less expensive to produce.

A few scientists have sung the praises of jojoba over the years; its oil has been used even longer as a cooking oil by the Indians. But recently a young chemist at the National Academy of Sciences, Noel D. Vietmeyer, has taken up the plant's cause. His list of jojoba oil's advantages is impressive.

The light yellow oil can be obtained merely by pressing the seeds; it requires little or no refining for use as a lubricant in high-speed machinery. It is slow to become rancid, it has viscosity, flash point and fire point similar to those of sperm oil and it remains liquid after taking up high amounts of sulfur. It does not even have sperm oil's fishy smell.

In addition, the oil can be easily hydrogenated (as corn oil is to make margarine), and the product is an extremely hard white wax apparently ideal for use in polishing waxes, the manufacture of carbon paper and a host of other processes. Candles made of jojoba wax burn with a brilliant, smokeless flame and do not soften or melt around the edges. In other forms, the oil could be used in a variety of products from linoleum to detergents to pharmaceutical preparations.

With all this potential, jojoba could apparently become an important cash crop, yet many thousands of

The jojoba plant (a cultivated bush is shown above) grows abundantly and wild on Indian lands.

tons of seeds ripen and go to waste each year. Probably this is because there has been no great pressure to develop the crop. Now a variety of pressures are building.

Noel Vietmeyer points out that the wild plant grows mainly on Indian reservations that have "no viable economic system at the moment. The development of a jojoba business, therefore, would help not only industry and whales but Indian welfare." Beyond that, it is relatively pest-free and, most important, requires little water.

Twelve inches of rainfall a year are sufficient to support large stands of productive bushes. Even four inches will produce a crop, and the amount of irrigation used on citrus orchards would kill it with overwatering. A cash crop of jojoba, which is so well suited to the arid conditions of the desert, would be a small drain on the area's water supply, now so heavily taxed by population growth and such water-consuming crops as cotton and sorghum that the water table is dangerously threatened.

At least two other crops are being explored by scientists as potential sources of raw material which may be chemically transformed into a sperm oil substitute. But none yet appears to have jojoba's potential to solve such a range of problems and no other plant yields molecules so similar to sperm oil without chemical tinkering.

Impelled by the promise of this "superbean," Vietmeyer sparked the interest of William Miller in the Indian Division of the Office of Economic Opportunity (OEO). And OEO has recently made a grant of $100,000 to get jojoba off the ground. At a February meeting in Riverside, California, where many studies of the plant have been made, Indian representatives of several Southwestern tribes met with officials of OEO, the Bureau of Indian Affairs and the Universities of California and Arizona to organize a large autumn harvest of jojoba seeds.

Delighted at the possibility of finding a truly indigenous and socially essential industry, the Indians intend to harvest enough jojoba to produce a tank-car load of oil for industrial testing.

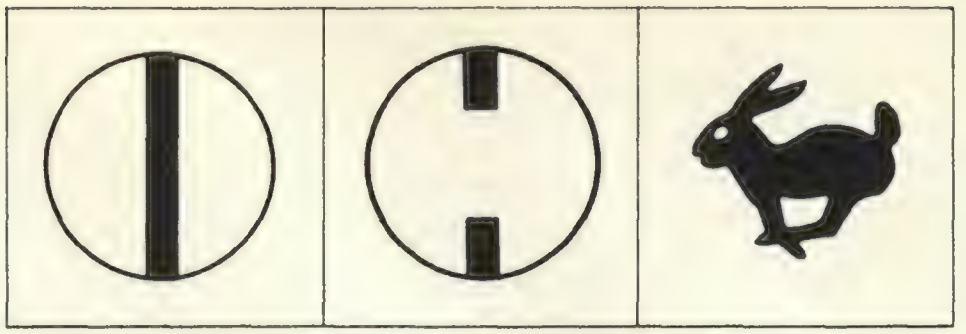
As Vietmeyer points out, "It is important to have tests made by people who are interested only in machinery, not in whales or Indians or anything else. We have to produce enough for them to run a variety of tests on all products that now use sperm oil. Industry must have enough to build up its knowledge of and confidence in jojoba. Lack of material has been the major impediment to jojoba utilization despite the pleas of researchers in the past."

Other specialists will meet during the year to pool information on the science of jojoba, and on optimum harvesting and processing techniques. Vietmeyer, Miller and their colleagues are hopeful that jojoba oil will pass all the tests.

Sometime in 1973, when there will be a few thousand fewer sperm whales in the world's oceans and less sperm oil in American industry's stockpiles, the verdict on the superbean will be in.

By Margaret Mead

Symbols speak their own language



Basic symbols: Certain symbols have become basic to communication. They appear and reappear . . .

Book by industrial designer Henry Dreyfuss classifies the symbols that people use—or might use—to bridge communication gaps

Henry Dreyfuss' *Symbol Sourcebook, An Authoritative Guide to International Graphic Symbols* is a major work in a new and exciting field. In his foreword, Buckminster Fuller describes Dreyfuss' role as "the leading product refinement designer." And he welcomes Dreyfuss' "contribution to a new world technique of communication" which he expects to "catalyze a world preoccupation with its progressive evolution into a worldian language."

Dreyfuss has gathered together about 5,000 different graphic symbols organized by 26 disciplines, such as "accommodations and travel," "agriculture," "architecture." Under "accommodations and travel" we find such symbols as "exit" and "entrance," "washroom" and "lost child." The symbols have been selected on the basis of clarity, common usage, or excellence of graphic presentation. To make this collection internationally usable—and incidentally to emphasize the limitation of the written word—Dreyfuss has added a table of contents in 18 different languages.

In addition, the handbook has many intriguing special features on basic form and their possible combinations, on the so far futile search for good symbols for "push" and "pull," on trade signs, hex marks, the peace symbol, the ecology symbol, the dollar symbol, the staff of Aesculapius, the whirligig and the swastika and even "OK." There are also hobo symbols and a very complete section on color.

This book will be a guide as well as a warning. For we are living in a time of birth and growth of new kinds of language. These are not the languages spoken and written by strange people far away, but a birth and growth that is happening all over the world.

You and I are already living with some of these graphic symbols which we encounter more and more frequently: the "stop" and "go" and "curve" and "crossing" signs on our highways, the blue and red dots for "cold" and "hot" water on water faucets, the skull and crossbones for "poison" or "danger" on chemicals and medicines, and the circle with a cross on top which indicates "church" on government maps.

There are literally hundreds of other graphic symbol languages intended primarily for specialists—for scientists and professionals in many diverse fields. There are symbol systems for astronomers, botanists, cartographers, chess players, electronic and other engineers, plumbers and welders. There are many books full of military and architectural symbols. There are symbols used by meteorologists, philatelists and choreographers and even by students who measure the metrical structure of verse.

The fact that so many symbol languages are springing up is an indication of a need for a means of communication which written words apparently cannot fill as well. Symbols, good symbols that is, have unique characteristics which words do not have: A written word has to be perceived through the eye; but after it is seen, its message has to be deciphered. Graphic symbols, on the other hand, speak directly through the eye. A "good" graphic symbol has a unique and concise meaning: An arrow pointing to the right should tell you clearly and with immediacy that you should go to the right; the words "go right," on the other

Famous cultural anthropologist and psychologist, Margaret Mead has always had a deep interest in the development of new means of communication.

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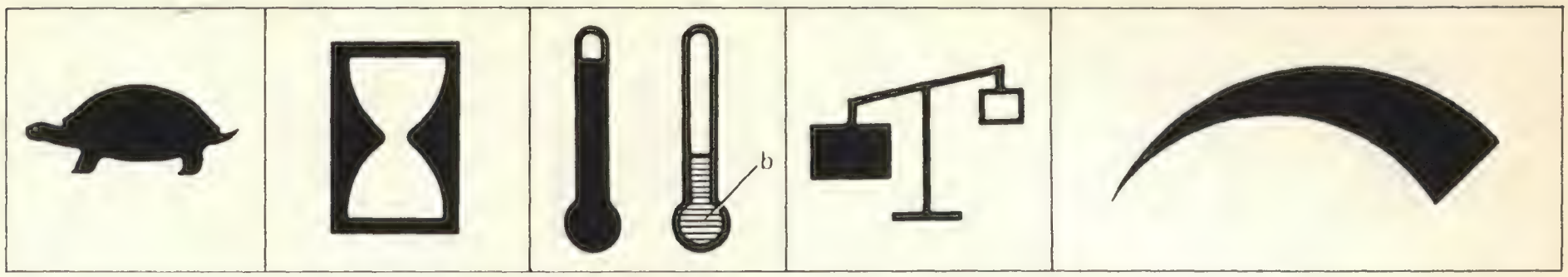
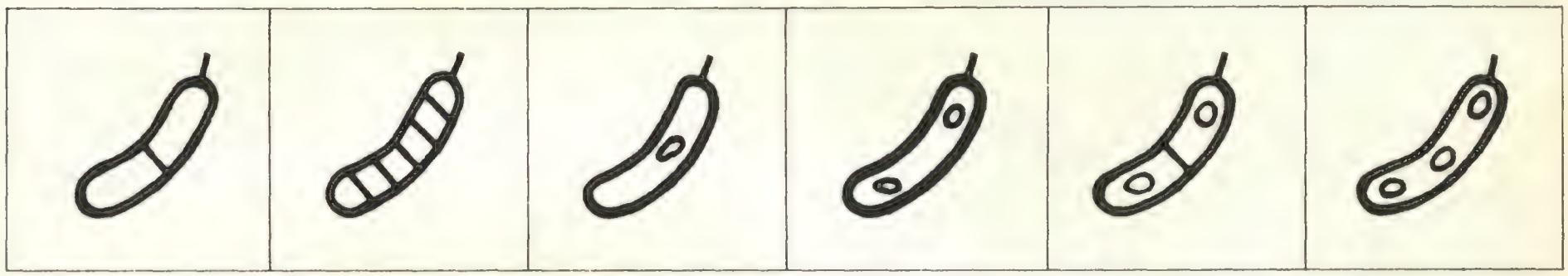


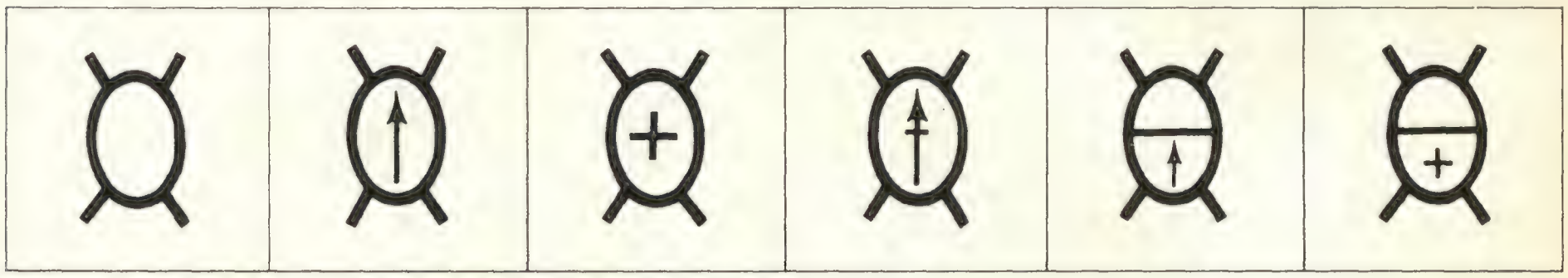
slow | time | hot . . . cold | heavy . . . light | continuously variable

and their meaning remains constant. They reassure us in our interpretation of complex directions and are fundamental to the understanding of any symbol system. They are the ABCs of symbols.



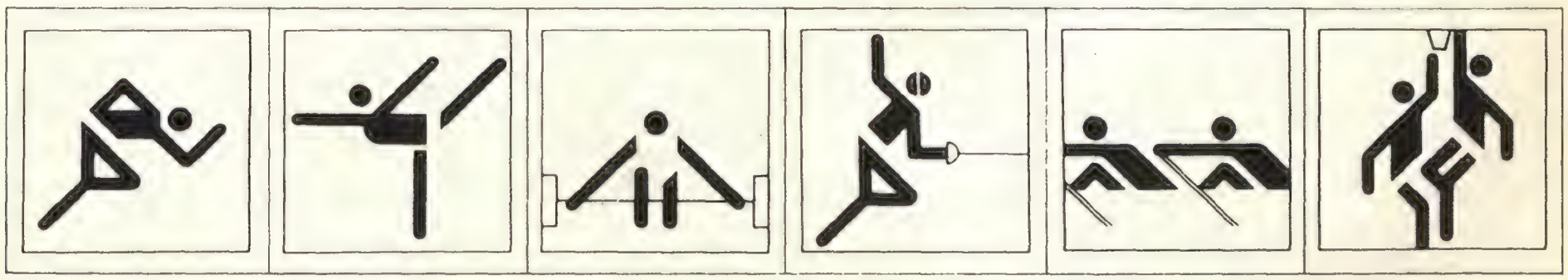
soybean | broad bean | lentil | vetch | lupine | pea

Agriculture: fruits and vegetables. Pictures on cave walls were sufficient for a time to express ideas about . . . procuring food and shelter. . . . Then languages began to proliferate.



horse | stallion | mare | gelding | colt | filly

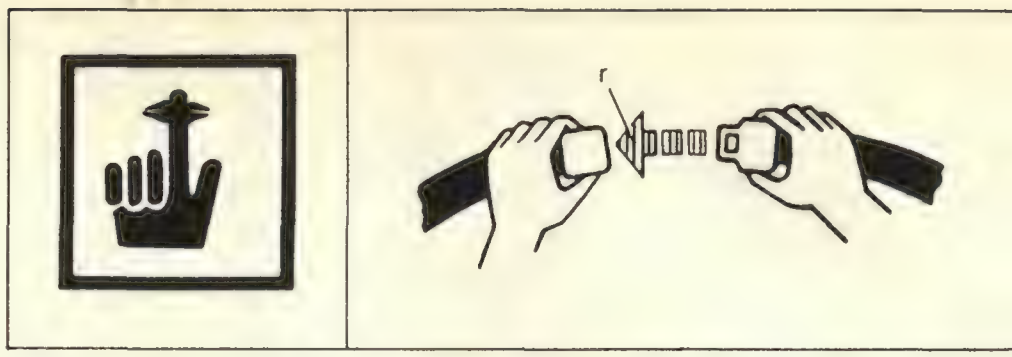
Agriculture: livestock and dairy products. As the world grows steadily smaller . . . man has apparently come full circle—from prehistoric symbols to verbal communication, and now back. . . .



track and field | gymnastics | weightlifting | fencing | rowing | basketball

Recreation: Olympics, 1972. Representational symbols present fairly accurate, if simplified, pictures of action. Abstract symbols reduce essential elements . . . to graphic terms.

thin ice customs maintenance



quiet fasten seat belts

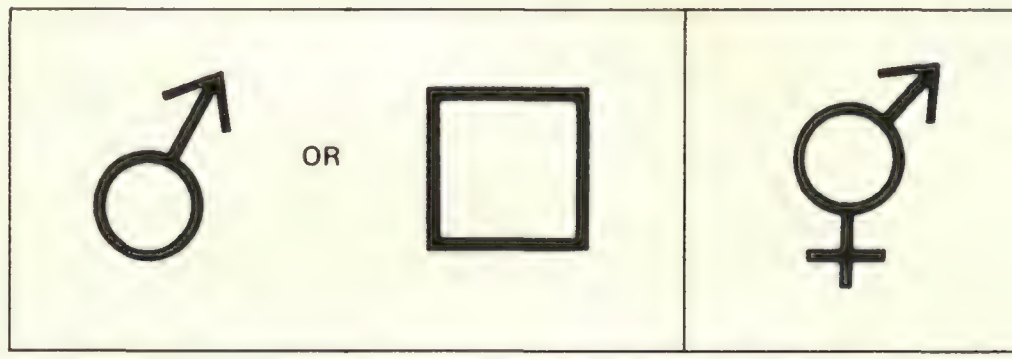
Graphic form: the hand. This is one of the ways the *Sourcebook* is organized—a unique compilation permitting identification of symbols (such as the hand) out of context, when unknown to the reader. It also hand, may indicate direction; but they may also have other meanings—political, moral, etc.

Another major advantage of a "good" symbol over words is that it hurdles the language barrier—the arrow pointing right is understandable by many different peoples regardless of their language or cultural backgrounds, and of course words are not. Symbols are usually space savers; a simple mathematical operation performed with number symbols and mathematical operators such as the "plus" or "minus" becomes a nightmare if it has to be done in written words. And an architect's or an engineer's blueprint could hardly be replaced by written verbal instructions.

The urgent need for more graphic symbols and the resulting topsy-turvy growth of symbol systems has long intrigued designers, engineers, anthropologists and other students. Social inventors have tried their hand in developing universal symbol languages. The outstanding exponents of the approach are Otto Neurath and Charles K. Bliss. Neurath developed an "international picture language" called Isotype, based primarily on stylized pictorial symbols. Bliss, also a native Austrian but now living in Australia, developed "semantography, one writing for one world," based on about 100 image-related basic symbols. Contributions by Bliss and Marie Neurath, Otto's wife, are part of the book.

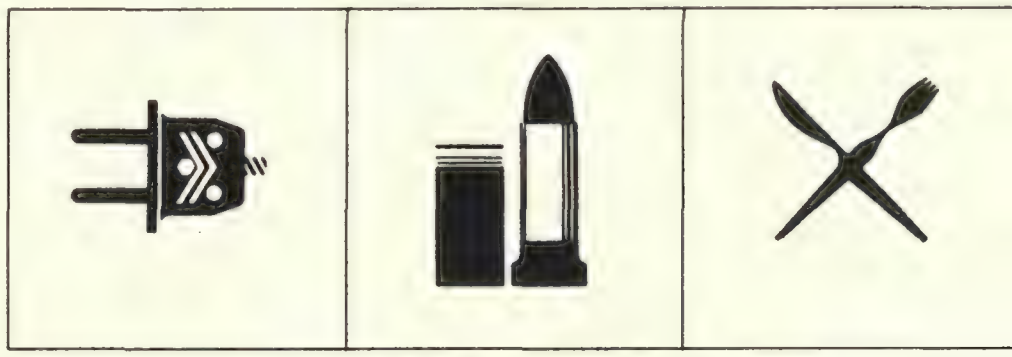
It seems to me that these pioneers tried to find solutions before the question of symbol development, testing and education had been sufficiently explored. It is welcome that other pioneers have made a less ambitious but more promising start. And the very finest step is to collect and classify the symbols now in existence. Henry Dreyfuss has provided such a sourcebook. It should greatly increase public attention on the role which graphic symbols do—and could—play in our society.

With Henry Dreyfuss, I can only agree that, "hopefully, with this *Sourcebook* as a start, standard symbols will some day be understood by all, regardless of language and culture."



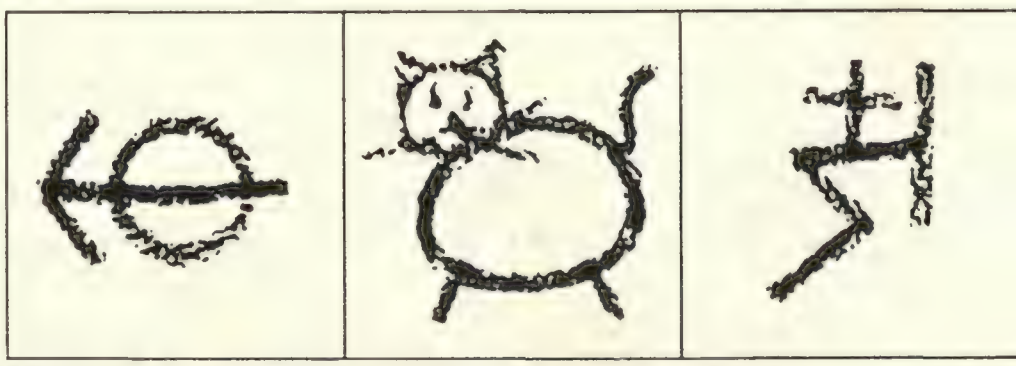
male neuter hermaphrodit

Biology: Arbitrary symbols are those that are invented, and accordingly must also



electrical supply cosmetics silverware

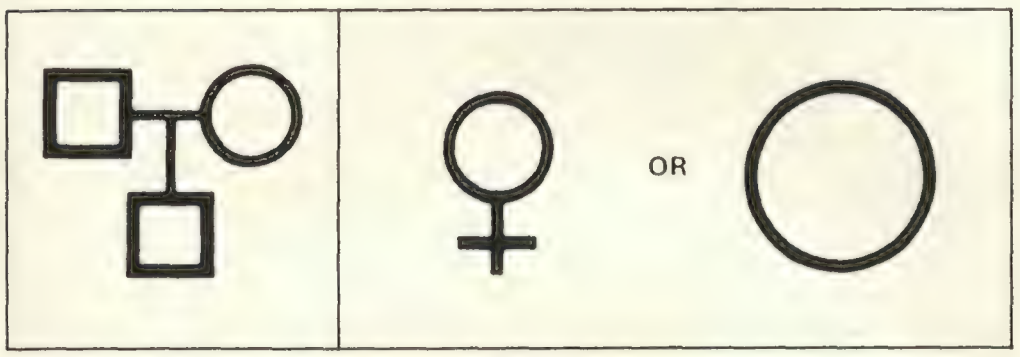
Business: shops and services. Manufacturers ship products all over the world, and translating



Hoboes have produced a system of graphic symbols all their own. It is international, and wanderers around the world can translate. If you found these chalked messages, could you read them?

currency exchange travel insurance information

permits the designer to familiarize himself
with existing uses and meanings of any given form.



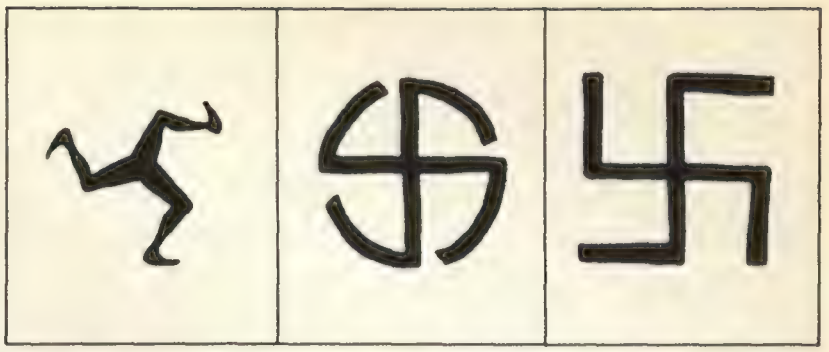
mating, male progeny female

be learned. The treble clef in music is an example;
also the mathematical plus and minus signs.

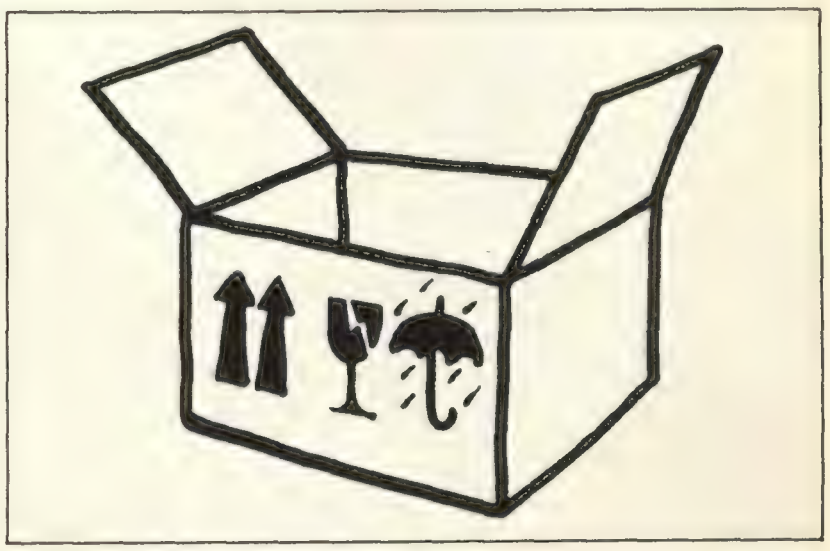
glassware kitchenware baby clothes

various . . . identifications and instructions into
the language of import countries is expensive.

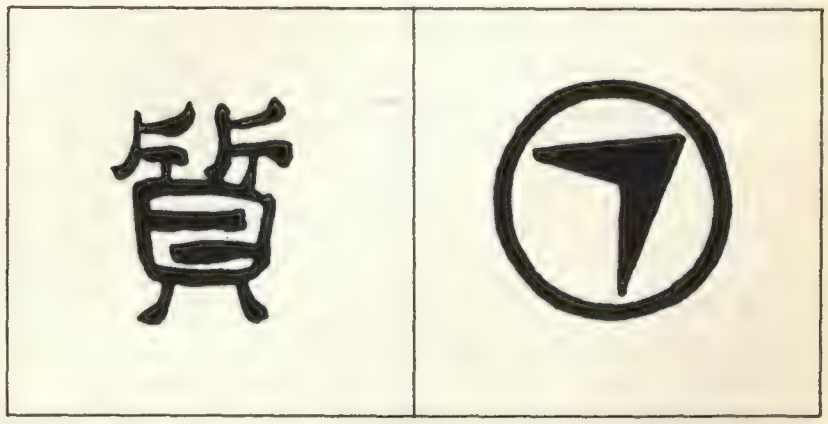
From left: No use going in this direction;
kind lady lives here; if you work, she will feed you;
you can sleep in the hayloft; if you are sick,
they'll care for you; vicious dog here!



Time is bound to erase the association of the swastika
with the Nazi holocaust. Long before the white man
appeared in the western hemisphere, it showed up on
artifacts. Did sun worshippers create it from the
sun circle (center)? Is it related to the three-legged
triskelion (left)? No one can trace its origin.



A carton shipped from the Soviet Union to the
United States had, other than the address, just three
stenciled symbol directions: arrows (this side up),
a goblet (fragile), an umbrella (keep dry).
Considering it might be routed via Constantinople,
Piraeus, Genoa and Lisbon, it "spoke" in six tongues.



We are indebted to the Medicis for the crest from
which we have borrowed the three golden balls that
hang outside our pawnshops. In Japan, the character
indicating a pawnshop (left) is called "sichi," which
also means "seven." So a stylized 7 (right) means
pawnshop. Embarrassed users call it the "6 + 1 Bank."

An unconventional portrait of Pope Paul VI is accepted by the Vatican

Those great patrons of the arts, the Renaissance popes, usually commissioned the artists in their employ—Raphael, Titian, Velázquez—to paint their portraits. The result was some of the greatest paintings ever produced.

Since then the practice has fallen off (along with the art of portraiture). So it was with some surprise that the world learned last fall that a portrait had been painted of Pope Paul VI, even though he did not commission it or, for that matter, sit for it. Moreover, it was in a semiabstract style unlike that of any previous papal portrait.

The artist was a 42-year-old German named Ernst Günter Hansing. Pope Paul did not at first respond to having his picture painted with any enthusiasm, but he later relented. Hansing was given a small studio in the building that houses the Vatican gas station, and for the next two and a half years, during 13 separate visits to Rome, he observed his subject from the front row at papal audiences.

The finished portrait has been accepted by the Pope. His Holiness described the painting as "a mirror of the situation of the church today." Earlier, on seeing a working sketch, he made what was probably his closest approach to art criticism. It was gracefully oblique: "One almost needs a new philosophy to grasp the meaning of this in its context."

By Dale W. Jenkins

The toxic metals in your future —and your past

Lead, mercury, arsenic and other poisonous substances have been with us a long time but not all of them are increasing hazards

In the last year the public has been exposed to a series of headlines and alarms about toxic metallic substances in the environment and in various foodstuffs. Lead poisoning has been designated a real problem. High contents of mercury have been found in tuna fish and swordfish, leading to speculation that we are seriously polluting the oceans with mercuric compounds. We have been warned about rising levels of cadmium and, most recently, about arsenic.

We will surely hear more about these toxic substances and about others: zinc, copper, selenium, cobalt, chromium, beryllium, nickel, silver, vanadium and manganese. (Arsenic and selenium, while not metals, are included since certain forms are highly toxic.)

The levels of these and other toxic metals in the environment, in foods and in living organisms have been analyzed since the turn of the century. More recently, older preserved specimens from museums and some from archaeological sites have also been analyzed. By collecting all this information we can put the toxic substances into historical perspective, enabling us to see trends and potential problems.

It is a paradox that some metals, such as chromium, cobalt, copper, manganese, vanadium and zinc, are essential in trace amounts to living organisms, but in higher concentrations they can also be lethal. As usual in this world, too much of any good thing is often bad.

Scientists tunnel into a misty Greenland glacier to analyze the lead content in its sequence of layers.

Taken into the body in air, or in food or liquid, certain chemical forms of cadmium, copper, mercury, lead, antimony, vanadium, and, of course, arsenic are dangerous. Several of the toxic metals are retained in the body for long periods of time, thus functioning as cumulative poisons: Among these are cadmium, lead and mercury.

Evidence is accumulating that several of these metals may produce cancer: arsenic, beryllium, chromium and nickel. Cadmium and lead, at the levels to which Americans are exposed, produce life-shortening and frequent neurological disruption in experimental rats. Most cadmium-fed rats displayed high blood pressure and hardening of the arteries.

There have been many conflicting claims based on limited evidence about the levels of these metals in

Dr. Jenkins is director of the Ecology Program in the Smithsonian's Office of Environmental Sciences. He is an "optimistic but realistic" ecologist.

the environment as each new discovery occurs. What is necessary now is to put all the available data into perspective. Only by doing so can we find out how badly we are polluting our nest and develop proper criteria for standards.

Fortunately, nature has left an accurate record awaiting our ability to interpret it. The historical record of toxic heavy metals is written in permanent snow and ice fields of Greenland and Antarctica, in mountains and caves, in bog layers and in the bottoms of lakes, estuaries and the oceans. One can estimate the time certain metals were introduced in the oceans from their distribution at various depths.

Living and dead organisms can also be used, such as tree rings, layers in mollusk shells and accumulations of creatures in accretion layers. Man has left his own records—in kitchen middens, refuse dumps, graveyards, artifacts and written records. In addition, and usually for other reasons, we have accumulated collections of animals and plants in museums.

This kind of ecological sleuthing requires the close cooperation of many disciplines. One must know which types of organisms—and which organs—accumulate or concentrate and store the metals. Cadmium, for example, concentrates in high amounts in moss and in the livers and kidneys of mammals, but not much in earthworms. Copper concentrates in mollusks, but not significantly in mammal bones. (One must also know the form in which a metal is toxic: Mercury itself is less dangerous than various mercury compounds.)

From such information, one can choose specimens to assess the levels of toxic metals in the past and also, importantly, to monitor the future. In general, carnivorous species at the top of food chains, such as hawks

and eagles, tuna and swordfish, make good gauges.

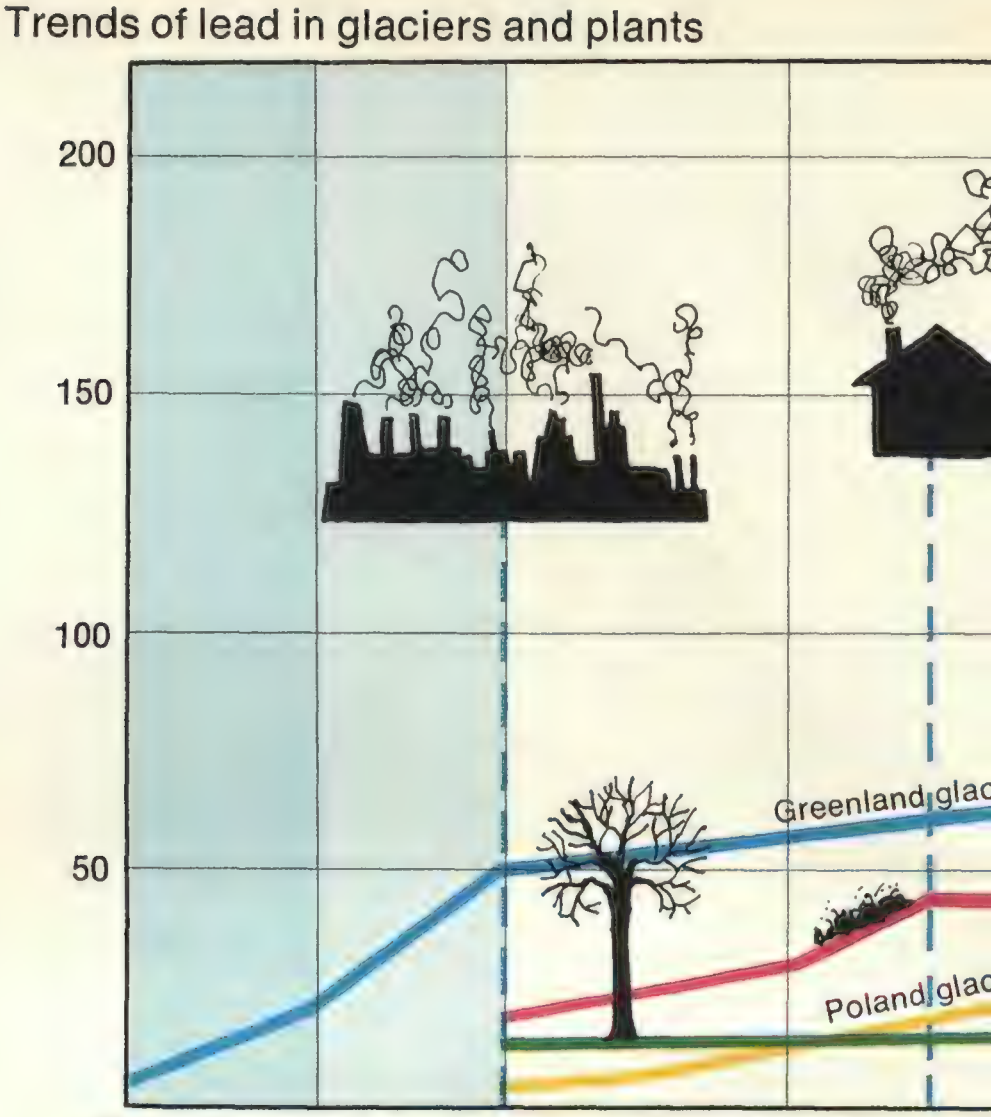
Studies of specimens, however, are complicated by the possibilities of contamination. A bird specimen may have been shot with lead pellets or preserved with lead arsenate. Nonetheless, with care and a great deal more research than has been done to date, we will be able to produce a fairly accurate historical record of toxic heavy metals in the environment. At present, several detailed studies have been made for lead, mercury and arsenic. Data are beginning to accumulate on copper, nickel, chromium and zinc.

In compiling the available information, I have expressed measurements of metal contents mostly as "parts per million" (ppm) of the metal in the organism or environment. One way to visualize ppm is to think of the world's driest martini: 1 ppm of vermouth would be the equivalent of one ounce of vermouth in 7,800 gallons of gin.

Nearly 4,500 years of lead

Man began digging lead out of the ground about 2500 B.C. As human use of this heavy gray metal grew over the centuries, quantities of it dispersed into the atmosphere and spread widely across the earth.

In the permanent snowfields in the northern Greenland area of the ice cap, Dr. Clair C. Patterson of the California Institute of Technology has gathered large blocks of ice from tunnels driven deep in glaciers and from walls of a thousand-foot long tunnel slanted to a depth of more than 300 feet. He found that from 800 B.C. to A.D. 1750 the amount of lead in dated snow layers increased by 500 percent and by another 400 percent between 1750 and 1940. This can be attributed to metal smelting and the burning of coal (see graph). The even sharper rise thereafter is due chiefly to the combustion of tetraethyl lead in automobiles.



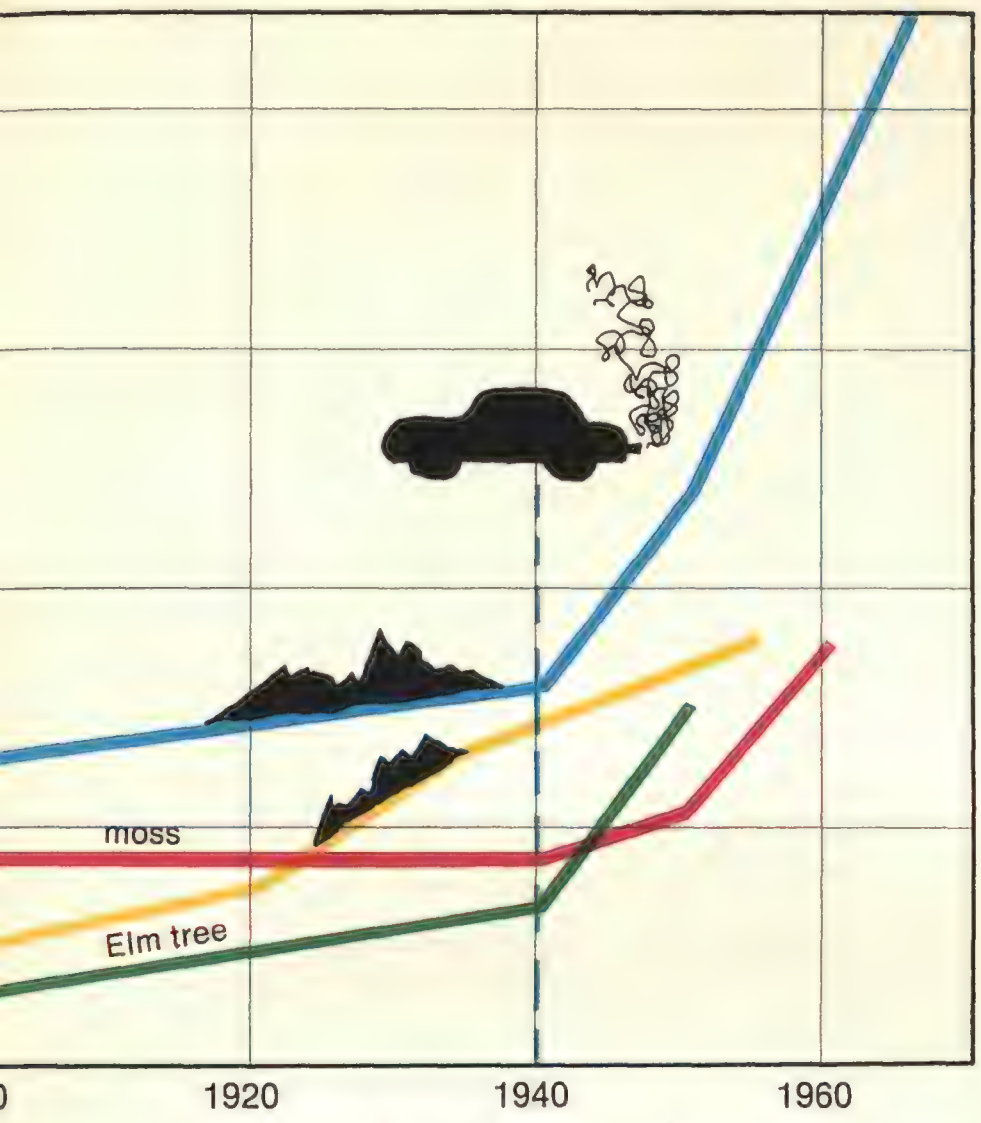
Lead levels in glaciers, moss and elm trees have been growing at similar rates, although the actual concentrations vary. Elm trees are graphed

Similar rates of increase for the last century have been found in the Great Mieguszowiecki Cirque and Glacier (above) and in an ice cave in the Tatry Mountains of south Poland, as well as in city dusts. These environmental increases of lead occurred in the northern hemisphere with industrialization and extensive use of automobiles. In 1946 the United States used about 50,000 tons of tetraethyl lead additive in gasoline and in 1970 about 300,000 tons.

Lead levels at the surface layers of the Pacific and Atlantic oceans and the Mediterranean Sea have increased far above levels in deeper waters, indicating relatively recent lead pollution.

In the Antarctic, however, snow layers from the very earliest to 1960 contained lead at low levels similar to the minimums observed in the Greenland ice of 800 B.C. This is not so surprising when one considers that there is very little mixing of air between the northern and southern hemispheres.

It is complicated and expensive to assay lead levels in remote snowfields. Far more accessible monitoring



above in parts per 100 million, Poland glacier in parts per billion. Moss is shown in parts per million, Greenland glacier in parts per trillion.

aids are moss and trees. Lead accumulates in higher concentrations (that is, more ppm) in moss and tree rings than in snow layers, but the rates are about the same making these organisms accurate gauges of environmental levels. Museum specimens of Swedish mosses showed an increase of 20 ppm between 1860 and 1875, to as much as 90 ppm in 1968. (It is instructive to note that mosses from northern Scandinavia where there are few, if any, roads had not reached 20 ppm in 1965.)

Humans are not good gauges for lead. Formerly we used lead in many ways that caused increased levels nearly independent of the overall environment. These included use of lead for cosmetics, cooking and kitchen utensils, water pipes, paint, lead pesticides for crops, and objects including toys and jewelry. Lead workers in industry, policemen, tunnel workers, garage personnel and agricultural sprayers all have occupational exposures that increase their lead levels. Lead poisoning in children in slum areas is common due to eating peeled paint containing lead. In Chicago from 1957

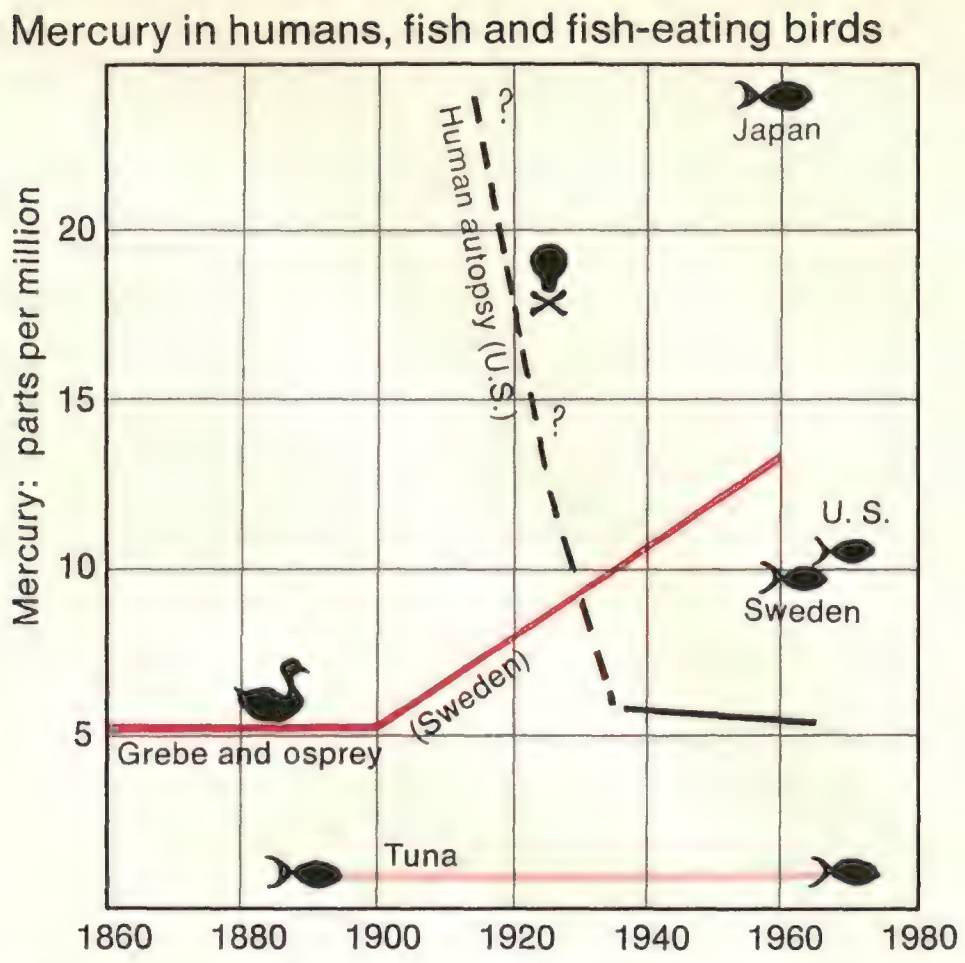
Looking up and out from the entrance to the Byrd Station on the Greenland ice cap, where snow layers dating back to 800 B.C. were tested for lead.

to 1966 there were a reported 1,311 cases with 138 deaths or 10.5 percent fatality. In New York there were 2,038 cases with 6.3 percent mortality of the children. In the Bronx Zoo in New York City animals have died from atmospheric lead pollution.

Some scholars, including Dr. S. Colum Gilfallen, have implicated lead in the fall of the Roman Empire. The ancient Romans used leaden pots and reduced the acidity of their wine by adding lead oxide to it. Lead poisoning, the argument goes, brought about widespread stillbirths, deformities and brain damage particularly among the upper (and ruling) classes who had greater access to leaden vessels and wine. Support for this theory comes from high lead content reported in the bones of some ancient Romans, though more analysis is needed.

Inca Indian bones from about A.D. 1300 show a low level (5 ppm). Human skeletons from wooden or stone coffins stored over the centuries in dry underground crypts in churches in Poland have been analyzed for lead content. Bones from the third century had about 3 ppm of lead, from the 11th century 92.5 ppm, the 13th century 80 ppm, the 17th century 115 ppm, the 18th century 45 ppm, and the 19th century 70 ppm. Present levels in the United States and Europe, while variable, average about 50 ppm. The more recent decrease from the high early levels may be a result of greater precautions in the use of lead, despite increased environmental levels.

The level of lead in blood of the U.S. population presently lies between 0.05 and 0.4 ppm with an average of 0.25 ppm. The toxic threshold level for classical



Mercury in tuna (and probably in oceans as a whole) has been fairly constant. But fish in many local areas have been badly polluted along with fish-eating birds. Content in humans may have declined.

lead poisoning is said to be 0.8 ppm in the blood and has more recently been proposed to be 0.5 ppm. These levels, while still subject to argument, provide little margin of safety, particularly since the possible effects of chronic cumulative low-level lead poisoning are not well known. The Environmental Protection Agency, in a recent report calling for reduced lead content in gasoline, said that 25 percent of inner-city children had blood lead levels exceeding safe amounts. Teeth from suburban children average from 11 to 15 ppm and children from the ghetto in Philadelphia from 51 to 109 ppm. Lung tissue of Americans contain twice as much lead as that of Africans.

Opinions of authorities are divided as to whether or not dangerous levels have already been reached, especially in cities. While human lead levels have certainly been higher in the past, environmental levels are now increasing rapidly in the overall environment of the northern hemisphere. The chief cause is tetraethyl lead in gasoline—a growing and serious hazard which should be halted as soon as possible.

Mercury in the oceans and in birds

Mercury, the familiar silvery liquid in thermometers, occurs naturally throughout the world in small quantities and is mined in some areas as the rocklike red cinnabar. Its uses are legion: in dental fillings, to kill germs, in the industrial production of chlorine, caustic soda and plastics. Inorganic mercury compounds are employed in more than 80 industries; highly toxic mercuric compounds are used in slimicides, fungicides, pesticides, in pharmaceuticals and paints.

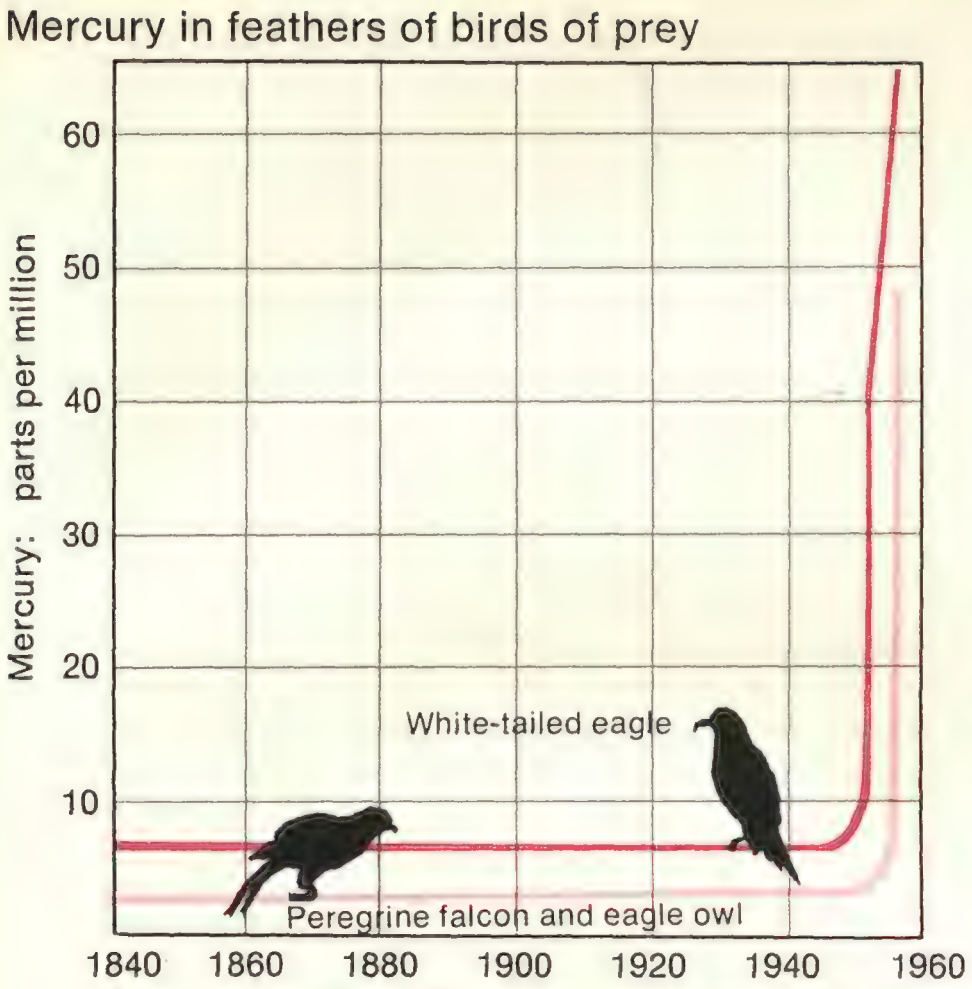
Altogether Man now uses about 10,000 metric tons a year and of this some 25 percent is lost to the environment. In addition, the burning of coal and oil adds some mercury to the atmosphere. But Man has not yet increased significantly oceanic mercury pollution.

The ocean contains about 0.0002 ppm, or about 300 million metric tons of mercury. Throughout Man's history he has added less than 100,000 metric tons to the seas, a relatively small amount. Tuna and swordfish have probably always had fairly high levels of mercury: Specimens of tuna preserved in Smithsonian collections as early as 1890 had about 1 ppm, about the same maximum levels as in tuna collected in 1971. Indeed, tuna and anchovy from pre-Inca cultures in Peru, around A.D. 1200, had even higher levels.

On the other hand, Man's use of mercury has increased its levels elsewhere in the environment. Like lead, it has increased in the atmosphere of the northern hemisphere and spread widely. The record is fairly clear in the Greenland ice. There were low levels from 800 B.C. to 1952 and a 240 percent increase from 1952 to 1965.

Industrial wastes and agricultural runoff have heavily polluted local waters with mercury compounds—many streams, lakes, ponds, some estuaries and a few shallow coastal areas are seriously contaminated. The effects of this are immediately apparent in wildlife.

In Minamata Bay, Japan, mercury discharge from a vinylchloride factory caused 121 human cases of mer-



Moving up the food chain: Concentrations of mercury in Swedish birds of prey moved up as they ate birds which in turn had eaten seeds that were treated against mold with mercury dressings.

cury poisoning with 46 deaths due to eating mercury-contaminated fish in the 1960s. Twenty-three infants with cerebral palsylike symptoms were born of mothers who had eaten fish without showing mercury symptoms themselves. Methylmercury is concentrated in fetal red blood cells as much as 30 percent higher than in the mothers. Fish and shellfish found dead at Minamata had from 9 to 24 ppm of mercury, but those which were eaten had less. Pike in Sweden have had up to 9.8 ppm and walleye pike in Lake St. Clair in the United States had up to 10.5 ppm in 1970.

The present maximum permissible limit for mercury in food in the United States is 0.5 ppm. The margin of safety is therefore not large and residual uncertainties remain.

Museum specimens are currently being analyzed to show levels of mercury in fish from polluted areas before the introduction of mercury. In the St. Clair River system, mercury levels increased threefold from 1965 to 1970 in muskellunge and sea lamprey. In lake sturgeon, northern pike, sauger, smallmouth bass, walleye pike and white crappie, analyzed by Dr. Frank D'Itri at Michigan State University, the mean mercury concentration increased about five times between 1965 and 1970.

Mercury is deposited in large amounts in bird feathers. By analyzing museum bird specimens, Swedish scientists have shown that mercury in seed-eating birds such as pheasant and partridge increased rapidly after 1940, corresponding to the wide usage of mercury compounds for antimold treatments on crop seeds. And mercury increased even more sharply in those birds that prey on the seed-eaters—especially the peregrine falcon, goshawk and eagle owl.

Mercury poisoning causes eggshell thinning and mortality. Laboratory tests show that eating meat from hens killed by methylmercury killed goshawks and ferrets in two to three weeks.

A ban on mercury seed dressings was put in force in 1966 in Sweden. Swedish scientists were deeply concerned that the predatory hawks—few in number and with low reproductive rates—might be exterminated over large areas. Since then the goshawks have been recovering, their residues of mercury now dropping. Seed-eaters have responded even more promptly, returning to the earlier normal levels.

The nonmercurial seed dressings now used in Sweden are not only safe but result in no loss in crop yields. Unfortunately, toxic mercurial seed dressings are still widely used in the United States. As a result, pheasants in four states and Canada have been found to exceed legal limits.

As in the case of lead, humans do not accurately reflect the overall environmental levels. Man uses mercury for his own purposes and concentrates it in his immediate environment: He even takes it internally. In the 19th century, scores of mercurials were being prescribed in medicines and mercury has increased in foods due to its use in seed dressings, pesticides and preservatives.

Decreases in humans?

On the other hand, from 1913 to 1970, mercury levels in preserved tissues from 59 human autopsy cases analyzed in Detroit, Michigan, indicated a nearly fivefold decrease from about 24 ppm to about 5 ppm. These data could be unreliable, however, since mercury bichloride was often used to preserve tissues in earlier days. In any event, if there has been a real decrease, its causes are uncertain. Mercurial compounds were previously more commonly used in medicine, antiseptics and in the household and agriculture. Coal, previously used commonly for heating individual homes, contains small amounts of mercury, but there are no known data showing local decreases in atmospheric mercury.

Government crackdowns on industrial polluters are greatly decreasing mercury contamination in streams and other bodies of water. These efforts should cer-

tainly be continued and, as the Swedish case indicates, mercury compounds for seed dressings might be reduced without hurting crop yield in the United States.

Arsenic—medicine and poison

Arsenic has been used as a poison for many centuries. It tends to concentrate in the hair of its victims, thus providing a method of detection not only for coroners but ecologists—and historians.

A mystery long surrounded the death of Charles Francis Hall, the leader of an American party trying to reach the North Pole in 1871. Ninety-seven years after his death, hair and fingernails from his frozen grave were analyzed, and it was confirmed that he had been poisoned by arsenic. Historians are still arguing over the part arsenic may have played in the death of Napoleon. One sample of his hair contained 10.5 ppm, another had 3.5 ppm.

On the other hand, arsenic has been known to have medicinal value since the time of Hippocrates, and it has been used against a variety of diseases including syphilis. It depends not only on quantity, but on chemical form, as with so many other heavy metals. In its elemental form and in some compounds, arsenic is of relatively low toxicity. But arsenic trioxide and certain other arsenic compounds are highly poisonous.

Arsenic is fairly abundant for a trace element. The Earth's crust averages from 2 to 5 ppm; the oceans contain about .0005 ppm or higher. It is found in ores accompanying other metals and is obtained in large quantities in the form of arsenic trioxide in the smelting process. World production of arsenic trioxide in 1968 was 60,000 metric tons, nearly half being used in the United States.

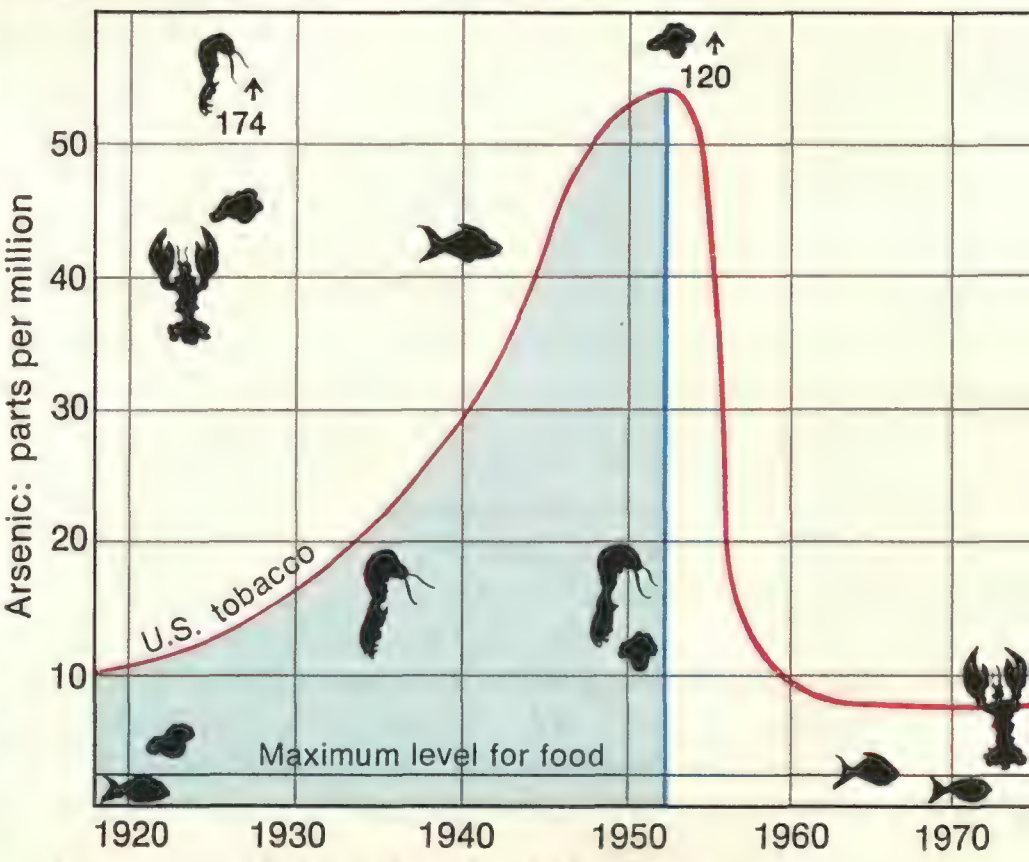
Its uses are many: as a dye, in the manufacture of glass and metal alloys, wood preservation, in flypaper, soap, rat poison, and in germicides and pesticides.

Until the introduction of DDT and other organic pesticides in the 1940s, lead arsenate insecticides were used in large quantities in the United States, especially on tobacco and apples. The arsenic trioxide content in U.S. tobacco increased from 10 ppm in 1917 to over 50 ppm in 1950 (see graph). When the use of lead arsenate declined, the decrease in tobacco was dramatic.

Another toxic arsenic compound—Paris green (copper acetoarsenite)—was used abundantly for many purposes from 1900 to 1950, including the control of mosquito larvae in salt marshes. This plus other arsenicals entered estuaries and is reflected in the high levels of arsenic found in marine invertebrate animals such as lobster, shrimp and mollusks.

With the decline in arsenical sprays and with the improved smelting and industrial processes, the amounts of arsenic in seafood have also, happily, dropped. In 1971, Norway lobster tail was found to contain 8 ppm. Yet even this is too high. The statutory maximum permissible level of arsenic in food is 1 ppm in Great Britain. In the United States it is 2.6 ppm. In early 1971, the Consumers Union suggested that the amount of arsenic in shrimp "may be a great deal more serious than that of mercury in tuna."

Arsenic in tobacco, fish and shellfish



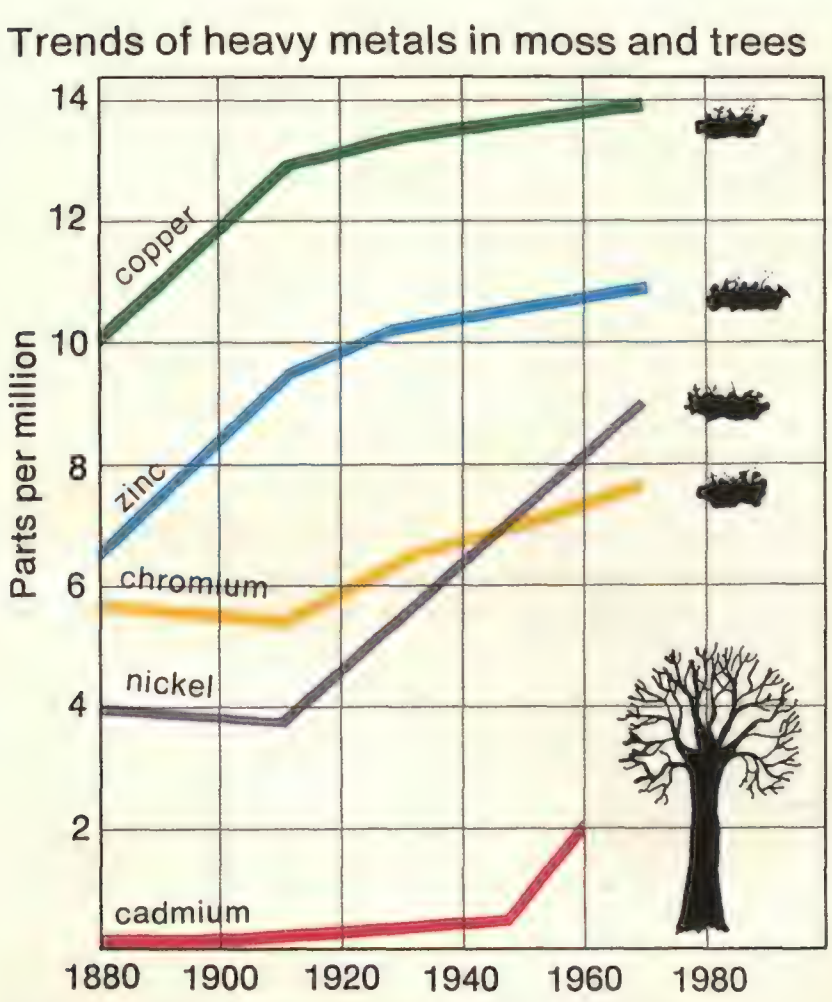
Arsenic trioxide levels found in U.S. tobacco reflected the use of lead arsenate sprays (blue area). A few spot measurements indicate high and now lower levels of arsenic in shellfish.

But high levels of arsenic are *not necessarily* a cause for undue alarm: Arsenic in its elemental form and other arsenic compounds are not so dangerous as arsenic trioxides. And the highly poisonous arsenic trioxides oxidize further in nature, turning into a less toxic arsenic compound. Clearly a good deal more research and information is necessary in this area.

This is even more true in the case of the other heavy metals. The final graph summarizes knowledge of environmental increases of copper, zinc, nickel, cadmium and chromium in plants. Cadmium and nickel show significant increases, while chromium has not grown significantly. More information is urgently needed.

Many programs are getting under way to perform the needed research. As part of the International Decade of Oceanographic Exploration, the Smithsonian's Museum of Natural History is assessing further the effectiveness of marine specimens in museum collections as indicators of marine contamination. Other organizations and scientists are assaying heavy metal levels in living and preserved organisms.

When these studies are done, we will be better equipped to understand the role of toxic metal substances in the environment, and to prevent and control them more intelligently.



Information is sparse for the other toxic heavy metals, but these five are known to be on the increase in two environmental indicators (moss and tree rings). Zinc is shown in parts per 100,000.

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Book reviews

South to a Very Old Place
Albert Murray
(McGraw-Hill, $7.95)

Albert Murray, a black intellectual, went down home again to interview Southern writers for *Harper's.* The result is this book about everybody. This includes the mysticisms and wisdom of Br'er Rabbit, the mannerisms of feed-and-grain-store whittlers, impressions of mammies, the now-polite white waitresses, the jive of ordinary blacks.

In Murray's words, the book is "an attempt to shift the emphasis of the current national dialogue from academic theory and news media cliché to the texture of personal experience, representative anecdotes of reality, the poetry inherent in memory."

It is a joy to find a person who can really write and, more, can battle hocus-pocus in all its forms. He brushes off the hullabaloos about equality by hauling in Ole Marster, the big symbol: ". . . Ole Marster got to put on his breeches one leg at a time just like everybody else . . . got to cry 'Have Mercy' when the wagon come. Because he also got to end up six feet in the ground, and may or may not have had any more enjoyment than anybody else. . . ."

What Mr. Murray found in his own people—even the lowliest—was a drive toward success. And those with strong promise *must* succeed; failure is despised. Said one of them: "All y'all want to go back to Africa, you welcome to go. Fare thee well, horse, I say. . . . Because what's going to happen is them Africans going to take one look at them goddam jive-time Zulu haircuts and them forty dollar handmade shoes and they going

to lock your American ass up in one of them same old slave-trading jails they put our ancestors in, and they going to have you writing letters back over here to this same old dog-ass white man in the United States of America asking for money."

Mr. Murray makes much of the mammy impression upon the "better class" Southerners. The oldest remember that mammy fixed the flounces on the white belle's attire, and it was to her that the girl came, last of all, to pose and know if everything looked right.

William Faulkner, eulogizing his mammy, said she was a "fount of authority over my conduct and of security for my physical welfare, and of active and constant affection and love. . . ." Mr. Murray says he could ask some embarrassing questions: "Damn man, if the mammyness of blackness or the blackness of mammyness was so magnificent and of such crucial significance as you now claim, how come you let other white folks disrespect and segregate her like that? How come you didn't put yourself out just a little bit more to please her? How can fellows like you be so enthusiastic about her and yet so ambivalent and hesitant about her brothers and sisters?"

Mr. Murray talks to the name writers to find they haven't lost, at least, their homespun qualities. And neither has he. Graduate of Tuskegee, teacher at Colgate, Brandeis, visiting professor of literature at the University of Massachusetts and a retired major in the U.S. Air Force, he remains unaffected: "Home" is no problem. And what is black, and what is white? What has the folkway done to everyone, except to make each a part of the other?

A book so extraordinary in its compassion and understanding demands another from so rich a talent.

—*Scott Hart*
Historian and novelist

Daisy Bates
Elizabeth Salter
(Coward, McCann & Geoghegan, $6.95)

She was born Daisy Mae in County Tipperary in 1863, a Protestant, privileged O'Dwyer. She died broke half the world away in 1951, a Commander of the British Empire and, more notably, *Kabbarli*—grandmother—among the Australian Aborigines. Daisy Bates was a "oner."

She emigrated in 1884 because she

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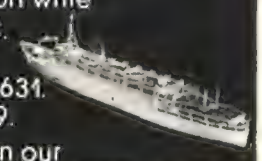

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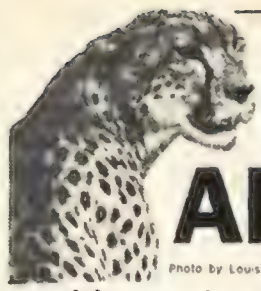

Photo by Louise Buckner

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was adventurous (though it was a "spot" on her lungs that persuaded TB-fearing relatives to permit the trip). Marrying a cattle drover almost on a dare, it seems, she bore him a single son and then abandoned his bed and board because he proved her intellectual inferior. It was not until the turn of the century that she turned her tireless physique and considerable brain to the Aborigines. But she had 50 years left and spent most of them in the barrens of western and southern Australia, learning the native language and customs, at once an unschooled Margaret Mead and an Outback Jane Addams who ministered to nomadic wards from a desert tent.

Daisy Bates was their devoted student, their self-appointed champion and ultimately their official, if unpaid, protector —the first woman to hold such a position. But she was scorned for years by government officials and professional scholars because she was a pest, an amateur and, apparently, a woman. She did, however, gain considerable popular prestige, even legendary stature through the Australian press, which covered her activities and carried her articles.

Elizabeth Salter's biography is lucid, detailed and balanced. In sum it is not overly mawkish about the Victorian pioneer so celibate that she could sleep in a Trappist monastery and so intransigent that she wore the same high-buttoned, low-hemmed English uniform for half a century in the searing Outback. If the book has a fault, it is its too-fine focus on the urbane dilemmas of Daisy's life—the male chauvinism of Australian officialdom. The battles she fought with white men haven't the singular fascination of the aboriginal ethos.

Daisy Bates learned the tribal secrets of a people who have inhabited the continent for 25 millennia. She became guardian of totems, witness of excruciating circumcision rites, chronicler of cannibalism. She recorded dialects and legends from the last survivors of family groups. She learned to forage and track.

In the course of time she learned to "think black" at the expense of being able to influence the white establishment. She appreciated aboriginal culture as unique, profoundly valuable *in situ* and more: "When these descendants of a prehistoric people ask the whites for 'drink price' they are quite unaware that they are asking favors of an inferior species of

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What went on every Saturday night at Rue de Fleurus . . . the home of Gertrude Stein. (Art in America)

Kenneth Clark tells why he opposes black studies programs. (Antioch Review)

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the human race." Such thoughts were hardly likely to endear her to the descendants of those who tamed Australia, exploiting the natives with baubles, booze, VD and the placebos of "civilized" economics. It seems the first whites were mistaken as envoys from some transstygian spirit world. Convinced of their manifest superiority, the settlers requisitioned Australia, as their kin took over Africa and the Americas; they just had an easier time of it.

The book comes at a propitious time. A Black Power movement as militant as its models in this country is rising among Aborigines, perhaps to revive Daisy's goal of separatism to preserve native culture.
—Philip Kopper
Editor and film writer

Food Pollution
Gene Marine and Judith Van Allen
(Holt, Rinehart and Winston, $8.95)

We certainly are in a fine kettle of fish—and don't be too sure about the fish, either. In a wild-and-woolly attack, subtitled "the violation of our inner ecology," Gene Marine and Judith Van Allen raise myriad doubts and cite numerous instances of deception and delay on the part of government sectors, collusion between government and industry and laxity on the part of would-be scientific experts, who are genially referred to as "Mad Scientists."

Here is a veritable floodtide of proof; indeed, at worst, the book seems to be an example of overkill. Nonetheless, if the layman succeeds in completing it, he will be left with a deep insecurity about what he eats—be it maraschino cherries with a color additive that is questionable, beef stroganoff that contains 25 percent less beef than specified; or so-called "enriched" bread, which the authors claim doesn't help build strong bodies one way, let alone 12, as ads have maintained.

Food Pollution is only one of a number of books being published this year about the unwanted ingredients in our food, the poisons and carcinogens of which we are unaware and the forces working to maintain the status quo. The authors offer—as the only solution—a no-holds-barred revolution by all concerned citizens. The elements of the manifesto: Eat natural foods, bake your own bread, con-

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trol more personally the feeding of infants, purchase pesticide-free lettuce and grapes, cease buying dry cereals and organize with neighbors and friends.

I can't say that Gene Marine and Judith Van Allen are reasoned and controlled in their argument, but I am impressed by their basic premise that if we cannot eat the decent foods we seek, something's got to give.

—*Michael J. Bandler*
Free-lance writer on ecological subjects

The Berengaria Exchange
Paul Knapp (Dial, $6.95)

I came to *The Berengaria Exchange* biased. A "lively account of a floating stock exchange during the fateful week of the 1929 crash," as the jacket blurb describes it, could be only another disastrous result of the current publishing penchant for books on arcane subjects. Its social commentary, historical value, even its entertainment value, seemed likely to be dubious.

Although his book is of the Cleveland Amory-Stephen Birmingham genre, Mr. Knapp does not approach these authors' capacity for social commentary and historical interest. And although Mr. Knapp may have intended it partly as a revelation of character in shipboard confinement, his book hardly rivals Katherine Anne Porter's mastery of that theme. But after saying that the book is not a classic, I hasten to add that my original bias soon collapsed. I was carried along on breezy prose and offered minibiographies—including warts on noses—of members of that society for whom few have shed any tears but whose capers continue to captivate: the millionaires who lost their yachts and palaces in October 1929 and temporarily had to make do with rowboats and simple cottages.

The Cunard flagship R.M.S. *Berengaria* sailed from Southampton on October 19, 1929, with its usual complement of wealthy passengers, "big-time gambler" and cosmetics queen Helena Rubinstein, mystery writer Edgar Wallace, an assortment of bankers, brokers, industrial nabobs, socialites, diplomats—and, installed in a converted stateroom, the shipboard brokerage office of M.J. Meehan & Company. Here the well-heeled could casually toss off several thousand

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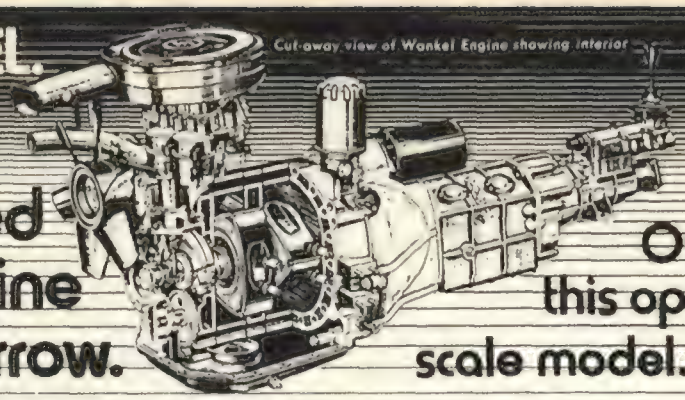

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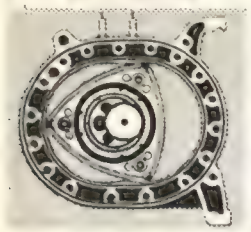

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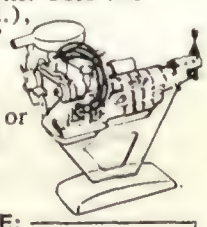

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dollars between bridge games, magnums of Bollinger *Brut,* and dancing—after slipping the bandleader the usual C-note.

The ship was captained by Sir Arthur Henry Rostron, whose social graces matched his naval skills—one wonders which of the two assets Cunard executives considered most desirable in its captains. Captain Rostron was a decorated World War I veteran and, as captain of the *Carpathia* in 1912, had exhibited courage and ability in rescuing *Titanic* survivors; however, as Mr. Knapp tells the story, "when the *Titanic* survivors were brought aboard his *Carpathia,* he'd made detailed arrangements to rescue First Class into First, Second Class into Second."

His most difficult decision on the *Berengaria's* October 1929 voyage: Should he relax inter-class barriers and allow Second-Class passengers, who stood to lose their shirts, to hear stock quotations in the First-Class brokerage office?

The story takes the captain and his passengers from Southampton to New York, arriving on October 25. It is a story of society high jinks, loosely tied together by the brokerage operations, the frequent climaxes and anticlimaxes as the stock market foundered during that last week before the crash. It is effectively set against the heavy overcasts and high seas of an October Atlantic crossing.

The narrative is a little thin; there are too many flashbacks. Nevertheless, it's an excellent job of reporting—perhaps best appreciated by another reporter. Knapp's capacity for digging out the smallest detail, some irrelevant, contributes largely to the pleasure of reading his book.

—Liva Baker
Author of *Felix Frankfurter*

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Smithsonian Staff Choices for April

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Death Valley National Monument: A look at the geology, climate, history of this desert region—April 14-20.

Weekend at the Smithsonian: Created especially for national members of the Smithsonian Associates, the tour will provide a firsthand exposure to the Institution. The program includes: Friday evening cocktails and orientation dinner, tours guided by curators, Saturday evening option of theater or concert, choice of Sunday field trip to Chesapeake Bay Center or visits to selected galleries and concluding reception with Smithsonian staff. Write address above for costs and reservations. Limited—April 21-23.

Northern Pueblo Indians: Five-day tours in the pueblo region of northern New Mexico—June departures.

Navaho Land, Arizona, New Mexico, Utah: Tours created by the Navaho tribe covering the history and natural wonders of their 25,000-square-mile nation—June departures.

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Solar Eclipse: A working trip to view the solar phenomenon from Prince Edward Island, Canada—July 5-11.

Archaeology Dig: A week's participation on a work dig in New Hampshire —August 6-12.

Arizona Astronomy Weekend: A unique opportunity to view the Smithsonian's Mt. Hopkins Observatory and other research facilities in the area—October 6-9.

Smithsonian highlights

Museum of Natural History
"Arabia Felix" is an exhibition of the culture of pre-Islamic southern Arabia, the land of the Queen of Sheba. Photographs and objects of alabaster and bronze illustrate the art of this region.

Musical Weekend in Washington
The Friends of Music at the Smithsonian and the Division of Musical Instruments will present three days of music, April 28-30, and will include tours of the Smithsonian Institution, the Kennedy Center, Wolf Trap Farm Park for the Performing Arts and a round of special events. This weekend will be a benefit for Smithsonian Educational Programs in the field of music. For information write: Mrs. Lois Howard, Division of Musical Instruments, Museum of History and Technology, Room 4124, Smithsonian Institution, Washington, D.C. 20560.

Division of Performing Arts
"Land of Oz," a new adaptation written especially for the Smithsonian puppets, will continue through April. The show is performed twice daily, Wednesday through Friday, and three times daily on weekends. For tickets to these presentations, call (202) 381-5395.

Freer Gallery of Art
"2,500 Years of Persian Art," a special long-term exhibit of Persian treasures from the Freer collection, celebrates the 2,500th anniversary of the founding of Iran (see pp. 16-23). The selection of jewelry, ceramics, miniatures and examples of calligraphy and illumination was based on a representation of diverse provenances, types and techniques.

"The Sanchi Torso, an Indian Masterpiece," an illustrated lecture given by John Irwin of the Victoria and Albert Museum, will be presented on Thursday, April 13, at 8:30 P.M.

Special events at the Institution
"A Program of Musical Images—the City, the Dance, the Theater and the Country," will be presented by Albert Fuller, harpsichordist, on April 8 and 9 in the Museum of History and Technology Auditorium at 8:30 P.M. Mr. Fuller will include in his program the music of Couperin, Rameau and Scarlatti.

"The Contribution of Progressive Myopia to the Rise of Impressionism: Visual Problems in the History of Art" is a multimedia lecture about vision to be given by Dr. Cary Lu of the California Institute of Technology April 18 at 8:30 P.M. in Spencer F. Baird Auditorium.

"Nefertiti and the Computer," an illustrated lecture, will be given by Ray Winfield of the University of Pennsylvania Museum and Director of the Akhenaton Temple Project on April 25 at 8:30 P.M. in the Spencer F. Baird Auditorium.

National Collection of Fine Arts
"Drawings by William Glackens (1870-1938)" includes some 60 works of this noted Ash-can School artist.

"Two American Painters: Fritz Scholder and T. C. Cannon" is an exhibition of 30 paintings by these two contemporary artists. Scholder combines Pop, put-on and protest in his painting. Cannon's paintings reflect a more traditional view of American Indian cultural values.

"Edith Gregor Halpert, Memorial Exhibition" is a selection of 26 works by artists represented in the Downtown Gallery, including Marin, Sheeler and Dove.

Arts and Industries Building
"World War I Fighters" is a habitat exhibit showing a front-line forward air strip in a reenactment of the capture of a Fokker D-VII. Also on exhibit will be memorabilia of the period with uniforms, medals and a commemorative case on the Lafayette Escadrille.

"Balloons" depicts the total history of ballooning from how they were invented

to future possibilities, covering forms, fabrics and functions.

Smithsonian Commons
Luncheon facilities for members of the Smithsonian Associates are located in the original Smithsonian Building. Open weekdays from 11:30 A.M. to 2:00 P.M., the Commons offers a buffet luncheon from $1.40 to $1.85 upon presentation of a membership card.

Renwick Gallery
This national showcase for American design, crafts and the decorative arts is now open to the public. Named for its architect, James Renwick (see February SMITHSONIAN), the gallery has opened with several exhibitions which provide a sampling of American applied arts from traditional Indian pottery through contemporary furniture made by craftsmen in wood.

National Portrait Gallery
"Washington in the New Era, 1870-1970," surveys the history of the black community in Washington, D.C., in the period between territorial government and the election of a nonvoting delegate to Congress.

Traveling Exhibition Service
More than 70 Smithsonian-sponsored exhibitions open each month throughout the United States and Canada. For a complete listing write: Traveling Exhibition Service, Smithsonian Institution, Washington, D.C. 20560.

- Portland, Oregon—"Graphics '71: West Coast, U.S.A.," (Portland Art Museum, April 8-May 7).
- Calgary, Alberta—"Georgian Country Houses," (Glenbow-Alberta Institute, April 15-May 14).
- Ames, Iowa—"Design and Color in Islamic Architecture," (Design Center, Iowa State University, April 22-May 21).
- Sandusky, Ohio—"Tibetan Carpets," (Sandusky Area Cultural Center, April 18-May 7).
- Phoenix, Arizona—"Vision of Peace in Painting," (Temple Beth Israel, March 25-April 23).
- Appleton, Wisconsin—"Alvar Aalto, architect," (Arts Center, Lawrence University, April 1-30).

THE BOYS FROM THE JACK DANIEL'S FRONT OFFICE say they've never had their pictures shown. Well, meet the boys from the front office.

Charlie Manley, the one in the middle, can remember when he was our only finance man. But now he has two assistants and a new calculating machine. And he loves to talk about how he's changed our bookkeeping methods over the years. Of course, when it comes to whiskey we still charcoal mellow it in the slow, old-time way. And, you can be sure, neither Charlie nor anyone else is about to be changing that.

CHARCOAL MELLOWED DROP BY DROP

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By Nan Lawler

Spot a lady in a bikini and find a rare fish

Several years ago a museum entomologist banded hundreds of monarch butterflies in an attempt to learn something about their local movements. He spent weeks with a stiff neck from looking up into trees. Friends in the area joined the search, and entomologists in other cities were alerted to be on the lookout for the banded butterflies. Only one ever turned up. It was brought to the museum by a little boy.

If you go into shock, chances are that the medics will start pumping Ringer's solution into you. Ringer's solution was discovered through the mistake of a lab assistant. He used tap water instead of distilled water in mixing up a saline solution.

If an experienced paleontologist takes a group of beginning students out to hunt for bones, you can guess who will find the Miocene camel, or whatever. Unless, of course, there happens to be a dog along, in which case the dog may well find the first bone. (The mandible of an australopithecine hominid, which has pushed the history of Man back to two million years ago, was found by an Ethiopian workman who thought it was the jaw of a pig.)

If a whole boatload of ichthyologists are out searching for a rare fish, they probably will not find it. But if they happen to have on board a photographer whose only real interest is taking underwater pictures of a lady ichthyologist in a bikini—well, of course . . . the elusive fish will swim up to him.

Ignoramuses are necessary. The history of great scientific discoveries has been, to a considerable extent, the result of amateurs, or at least of people working outside their fields. The dearth of exciting modern discoveries is not a result of everything already having been discovered. It is partly the result of turning discovery over to specialists.

Specialists do have their place. It takes a certain amount of training and experience to realize that a discovery has been made. It takes quite a bit of training and experience to know what on earth to do with the discovery after it has been made. A photographer focusing on a bikinied lady would not realize that the dumb fish that keeps getting in his way is special. And a paleontologist would find more interesting things to do with old bones than a dog could.

Specialists should not be excluded from scientific expeditions by any means. But they alone are not sufficient. They go about searching in a scientific, logical, methodical manner. In order to discover anything a certain amount of idiocy is often needed.

To be sure, it would be somewhat embarrassing at first to be listed as an expedition's staff ignoramus; but as the necessity for the position becomes recognized, its status will go up.

By the same token, every museum and laboratory would have at least one resident ignoramus to do things like pickling specimens in the wrong solution and thereby discovering better methods of preserving their color.

It should be emphasized that an ignoramus cannot double for anything else. One cannot, for example, also be the lab janitor. Being an ignoramus is a full-time job.

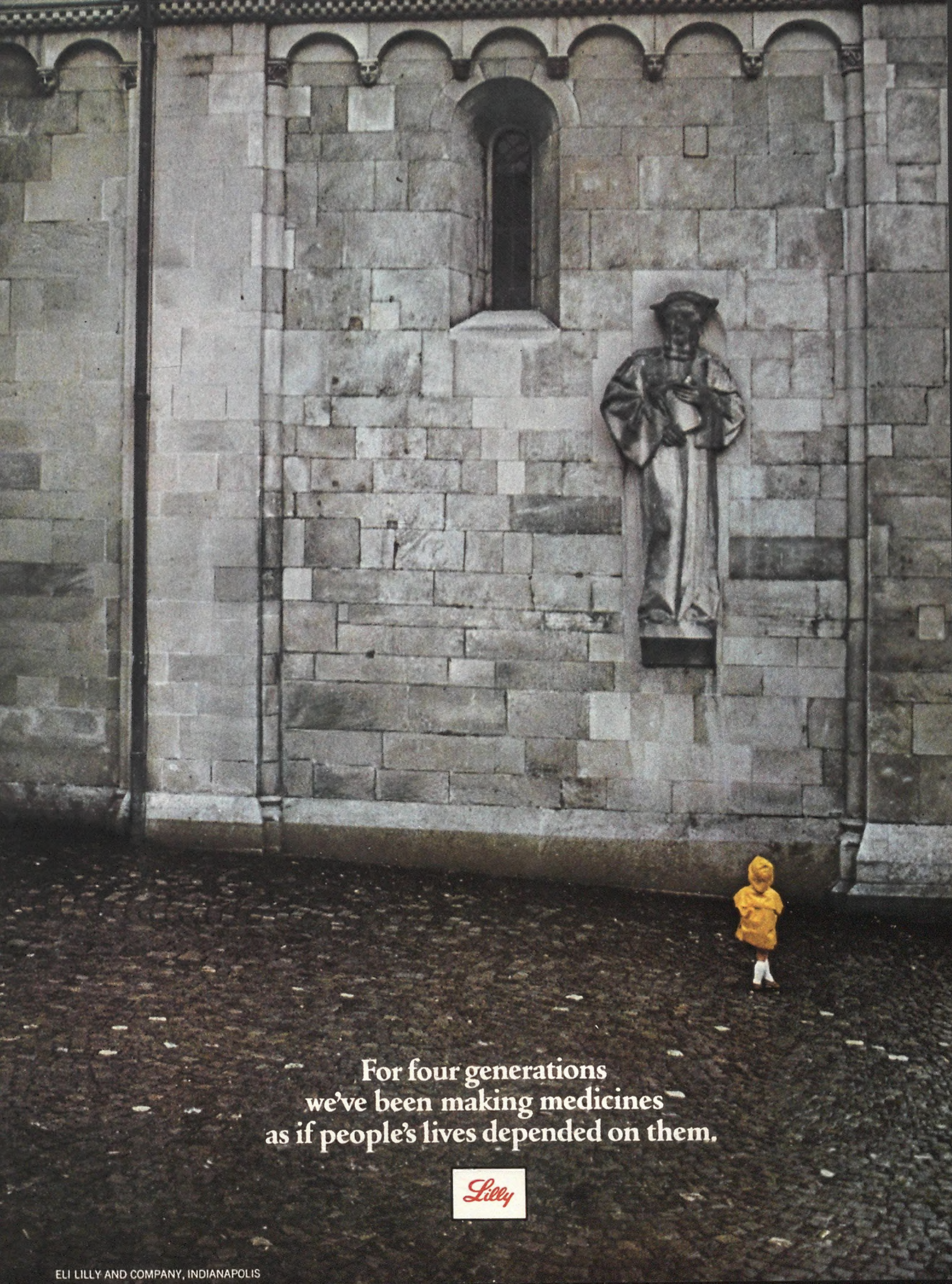
Nor does "ignoramus" mean a fool. A person can hold a Ph.D. in history and be an utter ignoramus when it comes to botany. A geologist would most likely be an ignoramus in entomology, and all the unemployed physicists we have at the moment would make excellent ignoramuses in any number of fields.

The expense of employing an ignoramus should be slight. First, the law of supply and demand would keep wages down. Since everyone qualifies as unlearned in at least a few subjects, the world is full of them.

Second, the ignoramus by definition is totally unqualified, and therefore in no position to quibble about wages anyway.

Third, the huge turnover would minimize the problem of pay raises. In any given field the ignoramus would inevitably pick up bits of information and would soon be disqualified.

In view of these arguments, and considering the benign acceptance of idiocy throughout history, it is not at all outrageous to suggest that the time has come for the scientific community to give it some official recognition.



ELI LILLY AND COMPANY, INDIANAPOLIS

Cartier trusted the cleaving of a diamond now worth $125,000 to the ride that's steady as a rock. 1972 Mercury.

July 7, 1971. In an actual demonstration for a TV commercial, a rough diamond worth $50,000 put Mercury's ride to a critical test.

Mr. Josef Briffel of Cartier's, New York, is about to cleave the gem in the rear seat of a moving Mercury. Will the ride be steady enough?

We chose a rugged test site: Dyckman Street, where the road is rough, uneven. Our speed at the critical moment: 35 mph.

At 1:51 P.M., the mallet strikes. Hit precisely, the diamond could more than double in value. The slightest mistake and it's worthless powder.

A perfect cleft! Two beautifully formed pieces are ready to be polished. The smaller is 4.75 cts. The larger gem an impressive 9.02 cts.

The finished jewel (actual size): this magnificent $125,000 Cartier diamond—an elegant reminder of Mercury's smooth, steady ride.

Better ideas make better cars.

MERCURY

LINCOLN-MERCURY DIVISION Ford

Mercury Marquis Brougham. Hi-Back Twin-Comfort Lounge Seats and cornering lights (shown) are optional.